

STIC Search Report

STIC Database Tracking Number 138991

TO: Eric Thomas

Location: JEF-10D20

12/8/2004 **AU 2831**

Case Serial No.: 10/733,265

From: Jeff Harrison

Location: STIC-EIC2800

JEF-4B68

Phone: 22511

Email: harrison, jeff

Search Notes

Dear Examiner Thomas:

Re: Silicone structure; metal salt; benzophenone backbone; solid electrolyte

Attached are edited results from subject-searching in the patent and nonpatent literature, mostly from Chemical Abstracts.

I tagged a few worth your review, but I suggest that you browse the entire stack of results.

I found a silicone + benzophenone, but not all these together: (silicone + benzophenone + metal salt + solid electrolyte + baked/heated)

If you'd like explanation or additional searching, let me know.

except in

Respectfully, Jeff

Jeff Harrison Team Leader, STIC-EIC2800 JEF-4B68, 571-272-2511

Results
(Imited to art
older than the
12/18/2002 priority date.



CAS/STN FILE 'REGISTRY' ENTERED AT 14:17:07 ON 07 DEC 2004 STRUCTURE UPLOADED

L58

L60

1 S L53 AND L21

54 S (L58 OR L59) NOT L57

```
50 SEA SSS SAM L1
          10128 S BENZOPHENON?
L3
               STRUCTURE UPLOADED
L5
       -Si_
            26 SEA SSS SAM L5
L6
             1 S SILICONE/CN
1.7
          1998 S SILICONE OR POLYSILICONE
L8
             1 S SILOXANE/CN
L9
              0 S L9 NOT L7
L10
          25829 S (SILOXANE OR POLYSILOXANE) AND C/ELS AND O/ELS
I.11
             22 S (L7 OR L8) AND C/ELS AND O/ELS
L12
          90320 SEA SSS FUL L1
L13
L14
          1024 SEA SSS FUL L5
     FILE 'HCAPLUS' ENTERED AT 14:28:44 ON 07 DEC 2004
L15
           906 S L14
          75221 S L13
L16
L17
          29487 S L12
          44113 S L11
1.18
L19
          29964 S L8
          61533 S L3
L20
L21
          83990 S L20 OR L16
          56493 S L15 OR L17 OR L18 OR L19
L22
L23
          1699 S L21 AND L22
L24
          28717 S SOLID (3W) ELECTROLYTE
             1 S L23 AND L24
L25
             25 S L23 AND THIN FILM
L26
             12 S L23 AND ELECTROLYT########
L27
             0 S L26 AND L27
L28
             0 S
                  (L26 OR L27) AND BAK####
L29
             15 S (L26 OR L27) AND (OVEN OR FURNACE OR ANNEAL##### OR RTA OR RTP OR HEAT###### OR THERMAL## OR
L30
                   TEMPERATURE (3A) (RAMP#### OR RAIS##### OR INCREAS###### OR ELEVAT#####))
             15 S L30 NOT L25
L31
L32
             6 S L15 AND THIN FILM
             3 S L15 AND ELECTROLYT#######
L33
            229 S L15 AND (BAK#### OR OVEN OR FURNACE OR ANNEAL##### OR RTA OR RTP OR THERMAL### OR TEMPERATURE)
L34
            16 S L15 AND BAK####
L35
            495 S L22 AND ELECTROLYT###############
L36
           1185 S L22 AND THIN FILM
L37
            614 S L22 AND BAK###
L38
            212 S L22 AND CAPACITOR
L39
L40
          71196 S METAL###(W)SALT
          14685 S
                  (LI OR LITHIUM) (2W) SALT
L41
             73 S (L25 OR L26 OR L27 OR L28 OR L29 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR L36 OR L37 OR L38
L42
                    OR L39) AND (L40 OR L41)
                SEL PLU=ON L42 1- RN :
                                           1050 TERMS
L43
     FILE 'REGISTRY' ENTERED AT 14:41:23 ON 07 DEC 2004
L44
           1051 S L43
            162 S L44 NOT C/ELS
L45
            113 S L44 AND LI/ELS
L46
            252 S (L45 OR L46)
L47
     FILE 'HCAPLUS' ENTERED AT 14:42:49 ON 07 DEC 2004
L48
             67 S L42 AND L47
            596 S L22 AND (L40 OR L41)
L49
              6 S L49 AND THIN FILM
L50
             16 S L49 AND SOLID ELECTROLYTE
L51
             7 S L49 AND BAK####
L52
L53
             51 S L48 AND ELECTROLYTE
              5 S L48 AND CAPACITOR
L54
             16 S L48 AND SOLID ELECTROLYTE
L55
             6 S L48 AND BAK###
L56
L57
             16 S L25 OR L31
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53 S (L32 OR L33) OR L35 OR (L50 OR L51 OR L52) OR (L54 OR L55 OR L56)

```
FILE 'HCAPLUS' ENTERED AT 14:42:49 ON 07 DEC 2004
             0 S L60 AND POLYSILICONE
L61
             18 S L60 AND ?SILICONE?
L62
                  (L44 OR L45 OR L46 OR L47) AND L62
L63
             17 S
             18 S (L62 OR L63)
L64
             36 S L60 NOT (L64 OR L57)
L65
             26 S L65 AND (CAPACITOR OR SOLID ELECTROLYTE OR BAK#### OR PREBAK####)
L66
             10 S
                  L65 AND (ULTRATHIN###### OR THIN###### OR MEMBRAN#######)
L67
             35 S (L66 OR L67)
L68
             36 S (L65 OR L66 OR L67 OR L68)
L69
             O S L14 AND ((L40 OR L41) OR L47) AND ELECTROLYT####### AND BAK########
L70
             2 S L14 AND ((L40 OR L41) OR L47) AND ELECTROLYT#######
L71
              4 S L14 AND ((L40 OR L41) OR L47) AND BAK#######
L72
             5 S L14 AND ((L40 OR L41) OR L47) AND THIN FILM
L73
L74
              1 S
                  L14 AND ((L40 OR L41) OR L47) AND MEMBRANE
              0 S L14 AND ((L40 OR L41) OR L47) AND CAPACITOR
L75
L76
             70 S L69 OR L64 OR L57
L77
             1 S (L71 OR L72 OR L73 OR L74) NOT L76
                   (("HEAT TREATMENT"/CT OR "THERMAL TREATMENT"/CT OR ANNEALING/CT OR . . . /CT) AND L14
L78
            232 S
L79
              4 S L78 AND L21
              0 S L78 AND SOLID(4A)ELECTROLYT#######
L80
              O S L78 AND (MEMBRAN###### OR LAYER#### OR COAT#### OR LAMINA##### OR MULTILAYER##### OR
L81
                            SUBLAYER#### OR SUBCOAT####) (4A) ELECTROLYT########
L82
              1 S L78 AND ELECTROLYT#######
             76 S L78 AND ((L40 OR L41) OR L47)
L83
              1 S L78 AND CAPACITOR
L84
              0 S L78 AND CHARG####(2A)STOR####
L85
              0 S L78 AND BATTERY
L86
              0 S L78 AND FUELCELL
0 S L78 AND FUEL CELL
1.87
L88
L89
              2 S L83 AND (L21 OR BENZOPHENON?)
L90
             71 S L76 OR L77
              6 S (L79 OR L80 OR L81 OR L82) OR (L84 OR L85 OR L86 OR L87 OR L88 OR L89)
L91
              4 S L91 NOT L90
L92
           4871 S NIPPON PAINT?/CS, PA
L93
L94
            274 S OHATA M?/AU,IN
L95
            529 S MATSUMURA A?/IN,AU
              2 S
                   (L93 OR L94 OR L95) AND L15
L96
             63 S (L93 OR L94 OR L95) AND L16
L97
             59 S (L40 OR L41) AND (L93 OR L94 OR L95)
L98
              2 S L97 AND L98
L99
              4 S L96 OR L99
L100
     FILE 'WPIX' ENTERED AT 15:09:34 ON 07 DEC 2004
          17737 S (G100(P) J581(P) M150(P) M414(P) M532) /MO, M2, M3, M4
L101
          12026 S L101(P)(M121(P)M131)/M2,M3,M4
L102
           7926 S L102(P) (M280(P) M320) /M2, M3, M4
L103
           6741 S L103(P)(G010(P)G019)/M2,M3,M4
L104
           1834 S L101(P)M900/M0 OR L102(P)M901/M2,M3,M4 OR L103(P)M902/M2,M3,M4
L105
           7272 S L105 OR L104
L106
           4794 S L106(NOTP) (H1 OR H2 OR H3 OR H4 OR H5 OR H6 OR H7 OR H8 OR H9 OR J0)/M2,M3,M4
L107
           3745 S L107(NOTP)(J1 OR J2 OR J3 OR J4 OR J6 OR J9 OR K0)/M2,M3,M4
L108
            683 S (B414(P)B713(P)B760(P)B832(P)M411(P)M620(P)(B790 OR B798))/M0,M2,M3,M4
L109
            238 S L108(P) (B720(P)M510(P)M520(P)M530(P)M540)/M2,M3,M4
L110
            366 S L109(P) (M211(P)M282(P)M320(P) (M270 OR M272))/M2,M3,M4
L111
            258 S L111(P)M900/M0 OR L109(P)M901/M2,M3,M4 OR L110
L112
        255 S (L101 OR L102 OR L103 OR L104 OR L105 OR L106 OR L107 OR L108) AND (L109 OR L110 OR L111 OR L112)
L113
             16 S L113 AND BENZOPHENON?
L114
              7 S L113 AND ?SILICONE?
L115
              0 S (L114 OR L115) AND ELECTROLYT########
L116
                  (L114 OR L115) AND CAPACITOR
L117
              0 S
                   (L114 OR L115) AND THIN FILM
L118
              1 S
                   (L114 OR L115) AND MEMBRAN#####
L119
              0 S
L120
                   (L114 OR L115) AND BAK####
              O S (L114 OR L115) AND (LI OR LITHIUM OR METAL####(2A)SALT)
L121
                   (L109 OR L110 OR L111 OR L112 OR L113 OR L114 OR L115)
L122
            919 S
L123
              3 S L122 AND SOLID#### (2A) ELECTROLYT########
L124
             20 S L122 AND THIN FILM
             10 S L122 AND BAK#####
L125
                   (L123 OR L124 OR L125) AND ?SILICONE?
L126
              2 S (L123 OR L124 OR L125) AND BENZOPHENON?
L127
              2 S (L123 OR L124 OR L125) AND (PEROXIDE OR H202)
L128
L129
              1 S
                   (L123 OR L124 OR L125) AND CAPACITOR
                   (L123 OR L124 OR L125) AND STOR####
L130
              4 S
              1 S (L123 OR L124 OR L125) AND (LI OR LITHIUM OR METAL####(2A)SALT)
L131
             20 S L123 OR L125 OR (L126 OR L127 OR L128 OR L129 OR L130 OR L131)
L132
L133
             19 S L132 NOT L118
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FILE 'IFIPAT' ENTERED AT 12:21:07 ON 08 DEC 2004

1 S US2967170/PN

FILE 'STNGUIDE' ENTERED AT 12:21:30 ON 08 DEC 2004

FILE 'DPCI' ENTERED AT 12:22:00 ON 08 DEC 2004

4 S (GB842674 OR DE1103333 OR US2967170)/PN.D

SEL L2 1- PRN: 16 TERMS

FILE 'HCAPLUS' ENTERED AT 12:22:19 ON 08 DEC 2004

14 S L3

0 S L4 AND ELECTROLYTE

08dec04 11:52:20 User259284 Session D2990.2

File	2:INSPEC	1969-2004/Nov W4	
	(c) 2004	Institution of Electrical	Engineers

Set S1 S2 S3 S4 S5	1tems 28 5 2 56 0	Description SOLID() POLYMER() ELECTROLYTES/TI AND BASED/TI S1 AND LITHIUM/TI S1 AND SILOXANE AU='SMID, J.' S4 AND SILOXANE?? S4 AND BASED/TI
\$6	1	S4 AND BASED/TI

08dec04 12:57:52 User259284 Session D2991.2

File 94:JICST-EPlus 1985-2004/Oct W5 (c) 2004 Japan Science and Tech Corp(JST)

Set	Items	Description
S1	804	BENZOPHENON? OR DIPHENYL()KETON???? OR DIPHENYLKETON?
S2	12	S1 AND (POLYSILICONE??? OR SILICONE??? OR SILAN? OR
		SILAN????)
S3	1	S2 AND (LI OR LITHIUM OR SALT? ?)
S4	13	S1 AND PEROXID?
S5	2	S4 AND (LI OR LITHIUM OR SALT? ?)
s6	138	PEROXID? AND (POLYSILICONE??? OR SILICONE??? OR SILAN? OR
		SILAN????)
s7	1	S2:S6 AND ELECTROLYTE? ?

*	138991
SEARCH REQUEST FORM Scientific and Technica, 3/13/2004 This is an experimental format Please give suggestions	nical Information Center - EIC2800 or comments to Jeff Harrison, JEF-4B68, 272-2511.
Date 11-30-04 Serial # 10/733 265	Priority Application Date
Your Name Eric Thomas	Examiner # 76204
AU 2831 Phone 272-1985	
In what format would you like your results? Paper is the default.	PAPER DISK EMAIL
if submitting more than one search, please prioritize in orde	
The EIC searcher normally will contact you before beginnin with a searcher for an interactive search, please notify one	of the searchers.
Where have you searched so far on this case? Circle: USPT DWPI EPO Abs	JPO Abs IBM TDB
Other:	pertinent citations or
What types of references would you like? Please check	kmark:
What types of references would you like: I lease offeet	Other
Primary Refs Nonpatent Literature Secondary Refs Foreign Patents Teaching Refs	Other
desired focus of this search? Please include the conce registry numbers, definitions, structures, strategies, and topic. Please attach a copy of the abstract and pertinent PG Pub is 20040125544	l anything else that helps to describe the t claims.
F6 146 12 200 10 1 2 3 3 7 1	- Benzophenone structure
- C \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	- Den Lophenone 3114 Gere
- Solid electrolyte	Hora C.I.
has been made by baking a	
metal sait	Compound not
e.g. 1.th	IUm salt
	one cpd or polygilane
Preferably a capacitor el	lectroly fe
Stoff lize Only Type of Search	Vendors
Searcher: Harrison Structure (#)2 X	STN
Searcher Phone: 7251 Bibliographic V	Dialog X
Searcher Location: STIC-EIC2800, JEF-4B68 Litigation	Questel/Orbit
Date Searcher Picked Up: 12-7-09 Fulltext Date Completed: 12-8-09 Patent Family	Lexis-Nexis
Date Completed: 12 3 0 1 Patent Family Searcher Prep/Rev Time: 120 Other DP CT.	Other
75	•

.. ...

10/733,265 searched 12/7/2004

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· L133 ANSWER 2 OF 19 WPIX COPYRIGHT THE THOMSON CORP on STN
                        WPIX Full-text
      2004-373515 [35]
                                                                              Same Ohata
Assignee same
Invento
 DNN N2004-297068
                        DNC C2004-140539
      Electricity accumulating element has pair of electrodes, and dielectric
      thin film and solid electrolyte thin film between electrodes.
      OHATA, M; OKA, T; TSUSHIMA; H
 IN
      (NIPA) NIPPON PAINT CO LTD
 PA
      US 2004066606 A1 20040408 (200435) *
                                                      H01G004-06
                                                      H01G009-032
                    A 20040422 (200435)
      JP 2004128222
                     A 20040409 (200453)
                                                      H01G009-07
      KR 2004030351
                                          10/2/2002 priority
 PRAI JP 2002-290300
                          20021002
```

US2004066606 A UPAB: 20040603

NOVELTY - An electricity accumulating element comprises a pair of electrodes, and a dielectric thin film and a solid electrolyte thin film between the electrodes. The dielectric thin film is a metal oxide thin film.

USE - As electricity accumulating element.

benzophenone derivative having a benzophenone structure.

ADVANTAGE - The inventive element has a large electrostatic capacity.

TECHNOLOGY FOCUS - ELECTRICAL POWER AND ENERGY - Preferred Component: The metal oxide thin film is a chromium oxide thin film obtained by subjecting a chromium nitrogen oxide thin film to heat treatment of 400-800 degrees C. The solid electrolyte thin film is a thin

film obtained by firing a silicon-containing compound at at least 200 degrees C. Preferred Property: The metal oxide thin film has a thickness of 1-100 nm.

TECHNOLOGY FOCUS - POLYMERS - Preferred Component: The silicon-containing compound comprises polysilane that is soluble in organic solvent, or a silicone compound having a chemical structure represented by the general formula (I). R1-R12 = 1-10C aliphatic hydrocarbon that may be substituted with halogen or glycidyloxy, 6-12C aromatic hydrocarbon or 1-8C alkoxy; a, b, c, d = at least 0; anda+b+c+d = at least 1.It may further comprise a silicon compound, and peroxide or a

Same Silicone structure claimed as in 10/733,265

AB

Background of Invention in the PGPUB discusses Li Salt



US 20040066606A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2004/0066606 A1 Ohata et al. (43) Pub. Date: Apr. 8, 2004

(54) ELECTRICITY ACCUMULATING ELEMENT

(75) Inventors: Masashi Ohata, Neyagawa-city (JP);
Hiroshi Tsushima, Takatsuki-city (JP);
Takeshi Oka, Kobe-city (JP)

Correspondence Address: Law Offices of Townsend & Banta Suite 900, South Building 601 Pennsylvania Ave., N.W. Washington, DC 20004 (US)

(73) Assignee: Nippon Paint Co., Ltd.

(21) Appl. No.: 10/673,373

(22) Filed: Sep. 30, 2003

(30) Foreign Application Priority Data

Oct. 2, 2002 (JP) 2002-290300

Publication Classification

(57) ABSTRACT

An electricity accumulating element comprising a pair of electrodes, and a dielectric thin film and a solid electrolyte thin film sandwiched between the electrodes, wherein the dielectric thin film is a metal oxide thin film such as a chromium oxide thin film. The metal oxide thin film preferably has a thickness of 1 to 100 nm, and is preferably a film obtained by subjecting to heat treatment at a temperature of 400 to 800° C. The solid electrolyte thin film is preferably a thin film obtained by firing a silicon-containing compound at a temperature of 200° C. or more.

12/8/04, EAST Version: 2.0.1.4

ELECTRICITY ACCUMULATING ELEMENT

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an electricity accumulating element having a dielectric thin film and a solid electrolyte thin film between a pair of electrodes.

[0003] 2. Description of Related Art

[0004] It is reported that electroconductivity is exhibited by causing a highly electron-accepting compound such as molecular iodine or antimony fluoride to act on a silicon compound having a Si—Si bond as a main structure, such as polysilane (for example, Synthetic Metal, vol. 94, p. 299 (1998)).

[0005] As a method for making the whole of an electricity accumulating element into a solid form, there is known a method of using, as an electrolyte, a polymer material wherein an alkali metal salt such as lithium sulfate or lithium perchlorate is dispersed in a polar polymer such as polyethylene oxide, the polymer material being called solid electrolyte.

[0006] However, polysilane electroconductive materials wherein a highly electron-accepting compound such as molecular iodine or antimony fluoride is caused to act are instable and are difficult to handle in the air. It is therefore impossible to apply the materials to industrially useful electronic devices, typical examples of which include an energy element, a sensor and a transistor.

[0007] In the case of polymer solid electrolytes, the ion conductivity thereof is smaller than that of liquid or gel-form electrolytes; therefore, batteries using the polymer solid electrolytes do not satisfy specification for practical batteries.

SUMMARY OF THE INVENTION

[0008] An object of the present invention is to provide an electricity accumulating element having a large electrostatic capacity.

[0009] The present invention is an electricity accumulating element comprising a pair of electrodes, and a dielectric thin film and a solid electrolyte thin film sandwiched between the electrodes, wherein the dielectric thin film is a metal oxide thin film. The metal oxide thin film is preferably a chromium oxide thin film. The chromium oxide thin film is preferably a film obtained by subjecting a chromium nitrogen oxide thin film to heat treatment at a temperature of 400 to 800° C.

[0010] Examples of other metal oxide thin films include thin films made of oxides of lithium, calcium, magnesium, aluminum, zinc, yttrium, iridium, indium, cadmium, gadolinium, gallium, gold, silver, silicon, germanium, cobalt, samarium, zirconium, tin, strontium, cesium, cerium, selenium, tungsten, carbon, tantalum, titanium, iron, tellurium, copper, lead, niobium, nickel, platinum, vanadium, palladium, manganese, bismuth, and molybdenum. Oxides of alloy composed of two or more out of these metals may be used.

[0011] The thickness of the metal oxide thin film is preferably from 1 to 100 nm.

[0012] If the thickness of the metal oxide thin film is less than 1 nm, electricity may conduct through the thin film. If the thickness is more than 100 nm, the electrostatic capacity may become too small.

[0013] According to the present invention, an electricity accumulating element having a large electrostatic capacity can be produced by setting the metal oxide thin film between a pair of electrodes.

[0014] In the present invention, a solid electrolyte thin film is further set between the pair of electrodes. The solid electrolyte thin film in the present invention may be a thin film obtained by firing a silicon-containing compound at a temperature of 200° C. or more. The firing temperature of the silicon-containing compound is more preferably from 300 to 1500° C.

[0015] An example of the silicon-containing compound may be a compound comprising at least one selected from a polysilane which is soluble in organic solvent and a silicone compound. A preferable example of the silicon-containing compound is a compound comprising both of the polysilane and the silicone compound.

[0016] The following will describe the polysilane and the silicone compound.

[0017] <Polysilane>

[0018] The polysilane used in the present invention is any polysilane that is a linear, cyclic or branched silane compound having a Si—Si bond. The category of the polysilane includes compounds which are called polysilines.

[0019] Polysilane referred to herein is at least one polymer selected from the group consisting of linear polysilanes and cyclic polysilanes each having, in the chemical structure thereof, a main skeleton structure represented by the following general formula:

$$(R^{1}_{2}Si)_{m}$$
 (1)

[0020] wherein R¹'s, which may be the same or different, are each a hydrogen atom, or an alkyl, alkenyl, arylalkyl, aryl, alkoxy, hydroxyl, hydroxyl-containing phenyl, amino or silyl group, and m is from 2 to 10000,

[0021] silicone network polymers each having, in the chemical structure thereof, a main skeleton structure represented by the following general formula:

$$(R^2Si)_n \tag{2}$$

[0022] wherein R²'s, which may be the same or different, are each a hydrogen atom, or an alkyl, alkenyl, arylalkyl, aryl, alkoxy, hydroxyl, hydroxyl-containing phenyl, amino or silyl group, and n is from 4 to 10000, and

[0023] silicone network polymers each having, in the chemical structure thereof, a main skeleton structure represented by the following general formula:

$$(R32Si)x(R3Si)ySiz$$
 (3)

[0024] wherein R³'s, which may be the same or different, are each a hydrogen atom, or an alkyl, alkenyl, arylalkyl, aryl, alkoxy, hydroxyl, hydroxyl-containing phenyl, amino or silyl group, and the sum of x, y and z is from 5 to 10000.

[0025] In the polysilanes represented by the general formulae (1), (2) and (3), examples of the alkyl moiety of the alkyl group or the arylalkyl group and the alkyl moiety of the

alkoxy group include linear, cyclic and branched aliphatic hydrocarbon groups having 1 to 14 carbon atoms, preferably 1 to 10, and more preferably 1 to 6. Examples of the alkenyl group include monovalent linear, cyclic and branched aliphatic hydrocarbon groups having at least one carbon-carbon double bond and having 1 to 14 carbon atoms, preferably 1 to 10 and more preferably 1 to 6 carbon atoms. Examples of the aryl moiety of the aryl group and the arylalkyl group include aromatic hydrocarbon groups which may have at least one substituent. Preferred is a phenyl or naphthyl group which may have at least one substituent. The kind of the substituent of the aryl moiety of the aryl group or the arylalkyl group is not particularly limited. The substituent is preferably at least one selected from the group consisting of alkyl, alkoxy, hydroxide, and amino groups.

[0026] The polysilane used in the present invention may have at least one hydroxyl group bonded directly to one ore more Si atoms therein (i.e., a silanol group). The polysilane used in the present invention may have, on average per molecule thereof, one or more hydroxyl groups bonded directly to one or more Si atoms therein. The number of the hydroxyl groups contained in the polysilane is usually from about 0.01 to 3, preferably about 0.1 to 2.5, more preferably about 0.2 to 2 and most preferably about 0.3 to 1.5 on average per Si atom.

[0027] The method for introducing the hydroxyl groups to the polysilane may be any known method. For example, in a method of subjecting a halosilane to dehalogenation polycondensation or some other method, the introduction can easily be conducted by adding water to the reaction system at the time of the end of the polycondensation reaction.

[0028] There can also be used a silicon based polymer, containing a Si—Si bond, obtained by subjecting the abovementioned polysilane to heat treatment at 300° C or more in the atmosphere of an inert gas such as nitrogen or argon, or in the air.

[0029] As the polysilane, a silicon network polymer having a network structure is preferably used.

[0030] As the polysiline, a network-form polysilane described in Japanese Patent Application Laid-Open (JP-A) No. 2001-48987 can be used. That is, there can be used a network-form polysilane produced by causing Mg or Mg alloy to act on trihalosilane in an aprotonic solvent in the presence of a Li slat or a metal halide.

[0031] As the polysilane used in the present invention, a polysilane having a weight-average molecular weight of 1000 or more is preferred. If the weight-average molecular weight is less than 1000, properties of the resultant film, such as chemical resistance and heat resistance, may be insufficient. The weight-average molecular weight is more preferably from 1000 to 20000, still more preferably from 1000 to 10000.

[0032] <Silicone Compound>

[0033] An example of the silicone compound used in the present invention is a compound represented by the following general formula:

[0034] wherein R_1 to R_{12} , which may be the same or different, are each a group selected from the group consisting of an aliphatic hydrocarbon which has 1 to 10 carbon atoms and may be substituted with a halogen or a glycidy-loxy group, an aromatic hydrocarbon group having 6 to 12 carbon atoms, and an alkoxy group having 1 to 8 carbon atoms; a, b, c and d are each an integer of 0 or more; and $a+b+c+d \ge 1$.

[0035] Specific examples of the aliphatic hydrocarbon group which this silicone compound has include chain-form groups such as methyl, propyl, butyl, hexyl, octyl, decyl, trifluoropropyl, glycidyloxypropyl groups; and alicyclic groups such as cyclohexyl and methylcyclohexyl groups. Specific examples of the aromatic hydrocarbon group include phenyl, p-tolyl, and biphenyl groups. Specific examples of the alkoxy group include methoxy, ethoxy, phenoxy, octyloxy and tert-butoxy groups.

[0036] The kind of R_1 to R_{12} and the values of a, b, c and d, which are not particularly important, are not particularly limited if the silicone compound is made compatible with the polysilane and organic solvent and the resultant film is made transparent. In the case of considering the compatibility, it is preferable that the silicone compound has the same hydrocarbon group as the used polysilane has. In the case of using a phenyl methyl type polysilane as the polysilane, it is preferable to use, for example, a silicone compound of the same phenyl methyl type or a biphenyl type. It is possible to use, as a crosslinking compound, a silicone compound having in a single molecule thereof two or more alkoxy groups, such as a silicone compound wherein at least two selected from R₁ to R₁₂ are alkoxy groups having 1 to 8 carbon atoms. Examples of such a silicone compound include methyl phenyl methoxysilicone and phenyl methoxysilicone containing 15 to 35% by weight of alkoxy groups.

[0037] The silicon-containing compound may further comprise a silicon compound and at least one selected from a peroxide and a benzphenone derivative having a benzophenone skeleton.

[0038] The solid electrolyte thin film in the present invention is not limited to the above, and other examples thereof include a thin film made of manganese dioxide, and a thin film made of an electroconductive polymer (such as polypyrrole).

[0039] The thickness of the solid electrolyte thin film in the present invention is not particularly limited. The thickness is preferably from 1 to 100000 nm. [0040] Examples of the metal which can be used in the electrodes in the present invention include lithium, calcium, magnesium, aluminum, zinc, yttrium, iridium, indium, cadmium, gadolinium, gallium, gold, silver, chromium, silicon, germanium, cobalt, samarium, zirconium, tin, strontium, cesium, cerium, selenium, tungsten, carbon, tantalum, titanium, iron, tellurium, copper, lead, niobium, nickel, platinum, vanadium, palladium, manganese, bismuth, and molybdenum. Oxides of alloy composed of two or more out of these metals may be used. For the metal oxide thin film, oxides of the above-mentioned metals or alloys thereof can be used.

[0041] Examples of the electroconductive compound which can be used in the electrodes include electroconductive polymers such as polyacetylene, polythiophene, polyparaphenylene vinylene, polypyrrole, polyparaphenylene, polyacene, polythiazyl, polyparaphenylene sulfide, poly(2, 5-thienylenevinylene) and polyfluorene; derivatives thereof; and aromatic amine derivatives and polymers thereof. These electroconductive organic compounds may be used alone or in a state that a doping agent such as iodine is incorporated thereto.

[0042] The electricity accumulating element of the present invention can be charged by applying a given voltage or electric current between the pair of electrodes. After the charging, this element can be used as a power supply by taking off the used battery charger and then making the element and a load up to a closed circuit.

DESCRIPTION OF PREFERRED EXAMPLES

[0043] The present invention will be described in detail by way of the following examples hereinafter, but the present invention is not limited to these examples.

Example 1

[0044] An electroconductive chromium compound thin film substrate, wherein a chromium nitrogen oxide thin film (thickness: 20 nm) and a chromium thin film (thickness: 15 nm) were alternately and repeatedly deposited so as to form a five-layer structure having one of the chromium nitrogen oxide thin films as the topmost layer, was subjected to heat treatment at 500° C. for 2 hours, so as to yield a heat-treated substrate. The composition of this heat-treated substrate in the depth direction from the topmost surface was analyzed by X-ray photoelectron spectroscopy. As a result, it was verified that a thin film made of a chromium oxide (Cr:O-about 1:1) and having a thickness of about 20 nm was present in the topmost surface. The topmost surface portion was made of an insulator having a resistance of 1 MΩ or more.

[0045] Next, the following was applied onto this heattreated substrate: a silicon compound solution wherein 2 parts by weight of polymethylphenylsilane, 1 part by weight of polyalkylphenylsiloxane (silicone TSR-165, manufactured by GE Toshiba Silicone Co.), 0.3 part by weight of 3,3',4,4'-tetra-(t-butylperoxycarbonyl)benzophenone (BTTB-25, manufactured by NOF Corp.) and about 1/100 part by weight of a surfactant (R-08, manufactured by

Dainippon Ink & Chemicals, Inc.) were dissolved in anisole

at a dark place. The applied solution was then dried. Thereafter, the resultant was fired at 550° C. for 30 minutes to produce a solid electrolyte thin film.

[0046] Next, aluminum was vacuum-evaporated onto this solid electrolyte thin film so as to produce a sandwich type test cell (apparent electrode area: 0.15 cm²) having a structure of aluminum/the silicon compound thin film (solid electrolyte thin film) /the chromium oxide (dielectric thin film)/the electroconductive chromium compound.

[0047] About the test cell obtained through the abovementioned process, the electrostatic capacity thereof at 100 Hz was measured with an LCR meter. As a result, the electrostatic capacity was $0.23 \,\mu\text{F}$. The electrostatic capacity per unit area is shown in Table 1.

Example 2

[0048] A sandwich type test cell was produced in the same way as in Example 1 except that a manganese dioxide thin film was formed instead of the silicon compound thin film as the solid electrolyte thin film. The manganese dioxide thin film can be formed by a known method.

[0049] About the test cell obtained through the above-mentioned process, the electrostatic capacity thereof at 100 Hz was measured with an LCR meter. As a result, the electrostatic capacity was $0.23 \,\mu\text{F}$. The electrostatic capacity per unit area is shown in Table 1.

TABLE 1

	Electrostatic capacity (μF) per unit area
Example 1	1.5
Example 2	1.5
Comparative Example	0.1

Comparative Example

[0050] A sandwich type test cell was produced in the same way as in Example 1 except that the electroconductive chromium compound thin film substrate was used, as it was, without being heat-treated.

[0051] About the test cell obtained through the above-mentioned process, the electrostatic capacity thereof at 100 Hz was measured with an LCR meter. As a result, the electrostatic capacity was $0.05 \,\mu\text{F}$. The electrostatic capacity per unit area is shown in Table 1.

[0052] As is evident from Table 1, it can be understood that the test cells of Examples 1 and 2 according to present invention had a far higher electrostatic capacity than the test cell of Comparative Example.

[0053] According to the present invention, an electricity accumulating element having a large electrostatic capacity can be produced. The electricity accumulating element of the present invention can widely be used as an element of various electronic devices, and has a very high industrial value.

What is claimed is:

1. An electricity accumulating element comprising a pair of electrodes, and a dielectric thin film and a solid electrolyte thin film sandwiched between the electrodes,

wherein the dielectric thin film is a metal oxide thin film.

- 2. The electricity accumulating element according to claim 1, wherein the thickness of the metal oxide thin film is from 1 to 100 nm.
- 3. The electricity accumulating element according to claim 1, wherein the metal oxide thin film is a chromium oxide thin film.
- 4. The electricity accumulating element according to claim 3, wherein the chromium oxide thin film is a film obtained by subjecting a chromium nitrogen oxide thin film to heat treatment at a temperature of 400 to 800° C.
- 5. The electricity accumulating element according to claim 1, wherein the solid electrolyte thin film is a thin film obtained by firing a silicon-containing compound at a temperature of 200° C. or more.
- 6. The electricity accumulating element according to claim 5, wherein the silicon-containing compound comprises at least one selected from a polysilane which is soluble in organic solvent and a silicone compound having a chemical structure represented by the general formula:

wherein R_1 to R_{12} , which may be the same or different, are each a group selected from the group consisting of an aliphatic hydrocarbon which has 1 to 10 carbon atoms and may be substituted with a halogen or a glycidyloxy group, an aromatic hydrocarbon group having 6 to 12 carbon atoms, and an alkoxy group having 1 to 8 carbon atoms; a, b, c and d are each an integer of 0 or more; and $a+b+c+d \ge 1$.

7. The electricity accumulating element according to claim 6, wherein the silicon-containing compound further comprises a silicon compound and at least one selected from a peroxide and a benzphenone derivative having a benzophenone structure.

* * * * *

L69 ANSWER 5 OF 36 HCAPLUS COPYRIGHT ACS on STN 2004:18146 DN 140:79779 ED Entered STN: 09 Jan 2004 5/31/02 Jp priority ΑN Ionic conductors, and secondary batteries using them as solid electrolytes TΤ Iio, Keiichi; Yoshihara, Toshiaki TN Toppan Printing Co., Ltd., Japan PA APPLICATION NO. DATE DATE KIND 1/8/04 JP pub. PATENT NO. _____ ____ 20020531 JP 2002-159935 JP 2004006114 A2 20040108 ΡI 20020531 PRAI JP 2002-159935 The ionic conductors contain (A) organic-inorg. composite polymers prepared by hydrolysis-AB polycondensation of starting materials containing organic compds. RlaM1(OR2)4-a [M1 = (non)metal; R1 = organic functional group; R2 = ChH2h+1; h = 1-5; a = 1-3] and (B) alkali metal salts M2X (M2 = alkali metal; X = anion). The ionic conductors show good flexibility and are suitable for solid electrolytes having separator functions for secondary batteries. RL: (Device component use); (Industrial manufacture); (Technical or engineered material use); (Preparation); (Uses) (organic-inorg. composite polymer ionic conductors for secondary battery electrolytes and separators) 90076-65-6 HCAPLUS RN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, CN lithium salt (9CI) (CA INDEX NAME) b=1 f(a,c,d)=0153315-80-1 HCAPLUS Poly[(1,3-dimethyl-1,3:1,3-disiloxanediylidene)-1,3-bis(oxy)] (9CI) CN need another

C-si

subsituent 162477-44-3 HCAPLUS RN Poly[[1,3-bis[3-(oxiranylmethoxy)propyl]-1,3:1,3-disiloxanediylidene]-1,3-CN bis(oxy)] (9CI) (CA INDEX NAME) * STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT * 639819-48-0 HCAPLUS RN

Poly[[1,3-bis(3-hydroxypropyl)-1,3:1,3-disiloxanediylidene]-1,3-bis(oxy)] CN

Claim I ok but No heating?

ANSWER 1 OF 1 HCAPLUS COPYRIGHT ACS on STN L25

2003:591393 DN 139:150738 ED Entered STN: 01 Aug 2003 AN

Acid-base proton conducting polymer blend membrane for fuel cells ΤI

Nam, Kiehyun; Xu, Helen; Cao, Shuguang; Olmeijer, David; Servaites, Jon; Wang, Ying IN

Polyfuel, Inc., USA DΔ

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003062493	A1	20030731	WO 2003-US2361	20030123
US 2003219640	A1	20031127	US 2003-351257	20030123
EP 1476589	A1	20041117	EP 2003-705924	20030123
US 2002-351445P	P	20020123		
WO 2003-US2361	W	20030123		
	PATENT NO	PATENT NO. KIND	PATENT NO. KIND DATE WO 2003062493 A1 20030731 US 2003219640 A1 20031127 EP 1476589 A1 20041117 US 2002-351445P P 20020123	WO 2003062493 A1 20030731 WO 2003-US2361 US 2003219640 A1 20031127 US 2003-351257 EP 1476589 A1 20041117 EP 2003-705924 US 2002-351445P P 20020123

The acid-base proton conducting polymer blend membrane comprises a first acidic polymer having AB acidic subunits, a second basic polymer having basic subunits, and a third polymer containing one or more functional units for improving membrane conductivity, flexibility, water remaining ability, dimension stability, and methanol crossover. In one embodiment, the acid-base polymer blend membrane of the present invention comprises a first acidic polymer having acidic subunits, a second basic polymer having basic subunits, wherein at least one of the first acidic and second basic polymer comprises one or more functional units to improve the properties of the membrane. The functional units include hydrophilic units, adhesion promoter units, methanol block units, dimensional stabilizer units, and flexible units. Optionally, interpenetrating polymer networks are added to the blends to improve the membrane dimensional stability, and rubbers are optionally added to the blends to improve the membrane mech. properties and reduce methanol permeability. A typical membrane was manufactured by adding 0.2 g NH3 to 12 g AcNMe2 containing 0.7 g sulfonated PEEK, adding 0.3 g styrene-4-vinylpyridine block copolymer (number-average mol. weight vinylpyridine block 80,000, number-average mol. weight styrene block 160,000), casting, drying, soaking 16 h in 1.5 M H2SO4, and rinsing in water. No heating?

- (1) de Nora; US 4295952 A 1981 HCAPLUS
- (2) Formato; US 6248469 B1 2001 HCAPLUS
- (3) Prakash; US 6444343 B1 2002 HCAPLUS
- (4) Zupncic; US 4664761 A 1987 HCAPLUS
- **97917-34-5**, A 12 IT

(DMS-A 12, mech.-property improving component; acid-base proton conducting polymer blend membrane with good mech. properties, hydrophilicity, and decreased methanol permeability for fuel cells)

RN 97917-34-5 HCAPLUS

CN

Poly[oxy(dimethylsilylene)], α -[(3-aminopropyl)dimethylsilyl]- ω -[[(3-aminopropyl)dimethylsilyl]oxy]- (9CI) (CA INDEX NAME)

But no metal salt

$$H_2N_-$$
 (CH₂) 3 = S_1 = O_1 = O_2 = O_1 = O_2 = O_1 = O_2 =

31694-16-3D, PEEK, sulfonated, ammonium salts IT

(acid polymer; acid-base proton conducting polymer blend membrane with good mech. properties, hydrophilicity, and decreased methanol permeability for fuel cells)

31694-16-3 HCAPLUS

Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)

Benzophenone deriv

Re: Claim 4

```
L69 ANSWER 6 OF 36 HCAPLUS COPYRIGHT ACS on STN
                     139:338608 ED Entered STN: 24 Oct 2003
AN
     2003:836471 DN
TΙ
     Crosslinked polysiloxanes
     West, Robert C.; Zhang, Zheng-Cheng
IN
                                            APPLICATION NO.
                                                                    DATE
     PATENT NO.
                        KIND
                                DATE
                         ____
                                20031023
                                            US 2003-367013
                                                                    20030213
                          A1
ΡI
     US 2003198869
                                            WO 2003-US8784
                                                                    20030320
     WO 2003090299
                          A1
                                20031030
                                20020422 \
                          P
PRAI US 2002-374374P
     US 2003-367013
                          Α
                                20030213
     Disclosed herein are crosslinked polysiloxane polymers having oligooxyethylene side chains.
AB
     Lithium salts of these polymers are synthesized as liqs. and then caused to solidify in the
     presence of elevated temps. to provide a solid electrolyte useful in lithium batteries. A
     typical crosslinkable polymer was manufactured by heating 30 g polymethylhydrosiloxane 24 h at
     60° in PhMe with 102 g triethylene glycol allyl Me ether in the presence of Pt-
     divinyltetramethyldisiloxane complex catalyst.
     49718-23-2DP, Methylhydrogensilanediol homopolymer, reaction
TΤ
     products with triethylene glycol allyl Me ether
        (assumed monomers, crosslinkable; crosslinked polysiloxanes having
        oligooxyethylene side chains as lithium salts for
        batteries)
RN
     49718-23-2 HCAPLUS
     Silanediol, methyl-, homopolymer (9CI) (CA INDEX NAME)
CN
     CM
          1
     CRN 43641-90-3
     CMF C H6 O2 Si
     ОН
 HO_SiH_CH3
     31900-57-9D, Dimethylsilanediol homopolymer,
IT
     bis(allyldimethylsilyl)-terminated
        (assumed monomers, crosslinker; crosslinked polysiloxanes having
        oligooxyethylene side chains as lithium salts for
        batteries)
                                Claim (CA INDEX NAME)

Claim 4

For need a

third

C-Si

Silver
     31900-57-9 HCAPLUS
RN
     Silanediol, dimethyl-, homopolymer (9CI) (CA INDEX NAME)
CN
     CM 1
                                                                             a or c ord = 1
     CRN 1066-42-8
     CMF C2 H8 O2 Si
      OH
 H3C_Si_CH3
     9004-73-3DP, Poly[oxy(methylsilylene)], reaction products with
IT
     triethylene glycol allyl Me ether
        (crosslinkable; crosslinked polysiloxanes having oligooxyethylene side
        chains as lithium salts for batteries)
     9004-73-3 HCAPLUS
RN
     Poly[oxy(methylsilylene)] (8CI, 9CI) (CA INDEX NAME)
CN
     90076-65-6, Lithium bis(trifluoromethanesulfonyl)imide
IT
        (crosslinked polysiloxanes having oligooxyethylene side chains as
        lithium salts for batteries)
```

Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt

90076-65-6 HCAPLUS

RN

CN

Figure 3

Figure 4

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10/733,265 searched 12/7/2004
L69 ANSWER 8 OF 36 HCAPLUS COPYRIGHT ACS on STN
    2003:755131 HCAPLUS Full-text
AN
    139:269321
DN
    Entered STN: 26 Sep 2003
ED
     Separator for electrolytic capacitor
TI
     Tsukuda, Takahiro; Takaoka, Kazuchiyo; Hyodo, Kenji
IN
    Mitsubishi Paper Mills, Ltd., Japan
PA
                      KIND DATE
                                          APPLICATION NO.
                                                                 DATE
     PATENT NO.
                                           -----
                                                                 _____
                        ----
     _____
                               20030926
                                                                 20020319
                                         JP 2002-76381
     JP 2003272952
                        A2
ΡI
PRAI JP 2002-76381
                               20020319
     A heat-resistant separator for an electrolytic capacitor comprises a porous substrate modified
     with a silicate SinOn-1(OR)2n+2, where R = H, alkali metal, alkaline earth metal, (un)substituted
     C1-18 alkyl, (un) substituted C7-21 aralkyl, or (un) substituted C6-20 aryl, and n \ge 2.
     Electrolytic capacitors
ΙT
     Porous materials
        (silicate-modified separator for electrolytic capacitor)
     4935-68-6 17988-16-8
IT
        (silicate-modified separator for electrolytic capacitor)
     4935-68-6 HCAPLUS
RN
     Pentasiloxane, dodecaethoxy- (9CI) (CA INDEX NAME)
CN
           OEt OEt
                       OEt
                            OEt
 Eto_si_o_si_o_si_o_si_o_si_oEt
                 bEt
           bEt
                       bEt
      bet
     17988-16-8 HCAPLUS
RN
     Tetrasiloxane, decamethoxy- (9CI) (CA INDEX NAME)
CN
                OMe
           OMe
```

meo_si_o_si_o_si_o_si_ome оме

оме

Ьме

Ьме

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L69 ANSWER 7 OF 36 HCAPLUS COPYRIGHT ACS on STN
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W

ΑN 2003:797068 DN 139:310053 ED Entered STN: 10 Oct 2003

ΤI Polymer electrolyte for rechargeable electrochemical cell

IN West, Robert; Wang, Qingzheng; Amine, Khalil

PA Quallion LLC, USA

WO 2003-US8779

PATENT NO.		KIND	DATE	APPLICATION NO.	DATE	
PI	WO 2003083973	A1	20031009	WO 2003-US8779	20030320	
	US 2003180624	A1	20030925	US 2002-104352	20020322	
	US 2003180625	A1	20030925	US 2002-167940	20020612	
	WO 2003083970	A1	20031009	WO 2003-US2127	20030122	
	WO 2003083971	A1	20031009	WO 2003-US2128	20030122	
	US 2004214090	A1	20041028	US 2004-491071	20040326	
PRAI	US 2002-104352	. A	20020322		200.0020	
	US 2002-167940	A	20020612			
	WO 2003-US2127	Α	20030122			
	WO 2003-US2128	Α	20030122			
	US 2003-443892P	P	20030130			
	US 2003-446848P	P	20030211			
	US 2003-451065P	P	20030226			

20030320

AB Disclosed is a cyclic siloxane polymer electrolyte for use in lithium electrochem. storage devices such as secondary batteries and capacitors. Electrolyte polymers comprising poly(siloxane-g-ethylene oxides) with one or more poly(ethylene oxide) side chains directly bonded to Si atoms are convenient to synthesize, have a long shelf life, have ionic conductivity of over 10-4 S/cm at room temperature, do not evaporate up to 150°, have a wide electrochem. stability window of over $4.5\ \text{V}$ (vs. lithium), and are not flammable. Viscosity and conductivity can be optimized by controlling the size of siloxane ring or the length of poly(ethylene oxide) side chain. The polymer disclosed may also be used in solid electrolyte applications by use of solidifying agents or entrapping within solid polymers. Means to synthesize both 8 and 10 membered rings are described using both boron and triethylamine as catalysts.

ΙT Capacitors

2370-88-9, Tetramethylcyclotetrasiloxane 6166-86-5, Pentamethylcyclopentasiloxane IT (polymer electrolyte for rechargeable electrochem. cell)

RN 2370-88-9 HCAPLUS

CN Cyclotetrasiloxane, 2,4,6,8-tetramethyl-

Claim 1 structures

us 20030180624 says "Solidify in Oven or Heating Medium"

RN 6166-86-5 HCAPLUS

Cyclopentasiloxane, 2,4,6,8,10-pentamethyl-CN

IT 7791-03-9, Lithium perchlorate

13537-32-1D, Fluorophosphoric acid, Li alkyl salt

14283-07-9, Lithium tetrafluoroborate

29935-35-1, Lithium hexafluoroarsenate

21324-40-3, Lithium hexafluorophosphate 33454-82-9, Lithium triflate.

365460-35-1, Lithium trifluorotris(trifluoromethyl)phosphate

403699-22-9, Lithium trifluorotris(perfluoroethyl)phosphate

(polymer electrolytes containing cyclosiloxanes for rechargeable electrochem. cell)

RN 7791-03-9 HCAPLUS

Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME) CN

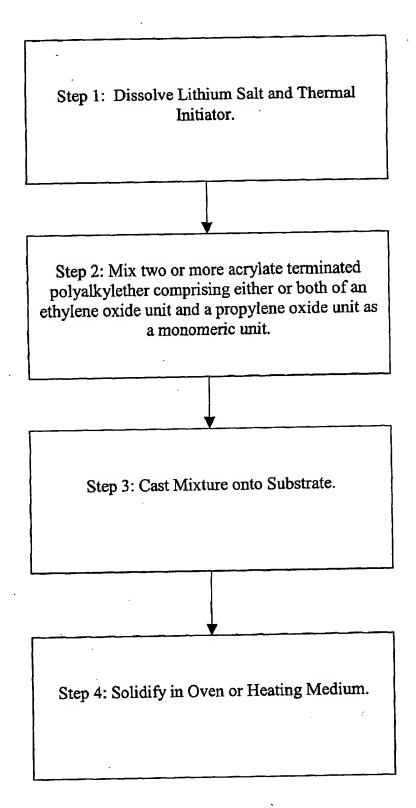


FIGURE 2

IT 117724-89-7P 612086-47-2P

(polymer electrolytes containing lithium compds. for rechargeable electrochem. cell)

RN 117724-89-7 HCAPLUS

CN Cyclotetrasiloxane, 2,4,6,8-tetrakis[2-[2-(2-methoxyethoxy)ethoxy]-2,4,6,8-tetramethyl- (9CI) (CA INDEX NAME)

PAGE 1-B

- O- CH2- CH2- O- CH2- CH2- OMe

____ CH2_ CH2_ O_ CH2_ CH2_ OMe

RN 612086-47-2 HCAPLUS

CN Cyclopentasiloxane, 2,4,6,8,10-pentakis[2-[2-(2-methoxyethoxy]ethoxy]-2,4,6,8,10-pentamethyl-(9CI) (CA INDEX NAME)

MeO_CH2_CH2_O_CH2_CH2_O_CH2_CH2_O_CH2_CH2_O MeO_CH2_CH2_O_CH2_CH2_O_CH2_CH2_O_Si_O_Si_Me MeO_CH2_CH2_O_CH2_CH2_O_CH2_CH2_O_CH2_CH2_O_Me MeO_CH2_CH2_O_CH2_O_CH2_CH2_O_CH

PAGE 1-B

__ CH2__ CH2__ O__ CH2__ CH2__ O__ CH2__ CH2__ OMe

____ CH2_ O_ CH2_ CH2_ O_ CH2_ CH2_ OMe

L69 ANSWER 9 OF 36 HCAPLUS COPYRIGHT ACS on STN

Entered STN: 18 Jul 2003

No baking mentioned?

139:101535 2003:551208 DN Production of oxyalkylene-containing acrylate-terminated polysiloxane crosslinking agents TI

Kang, Yongku; Lee, Changjin; Lee, Won Sil; Noh, Kun Ae IN

ED

PA	Korea Research PATENT NO.	Institute KIND	DATE	APPLICATION NO.	DATE	0. 1 of 5
		-				, · ·
PI -	US 2003134968	A1	20030717	US 2002-282214	20021028	· 1
	US 6783897.	B2	20040831			
	KR 2003040618	Α	20030523	KR 2001-70969	20011115	
	JP 2003277506	A2	20031002	JP 2002-324866	20021108	
PRAI	KR 2001-70969	A	20011115			

A crosslinking agent comprises Me siloxane polymer backbone, a poly(alkylene oxide) branches and AB from 2 to 4 of acrylate groups at both terminals. A solid polymer electrolyte composition comprises (a) 0.1-80% of the crosslinking agent, (b) 0.1-80% of a plasticizer selected from poly(alkylene glycol) dialkyl ethers and non-aqueous polar solvents, (c) 3-30% of a lithium salt, and (d) 0.5-5% of a curing initiator. The crosslinkable solid polymer electrolyte composition has a high ionic conductivity at room temperature and can be readily formed into a film suitable for use in large-size lithium-polymer secondary batteries applicable to elec. cars, power storage devices for power leveling, as well as in small-size lithium-polymer secondary batteries applicable to video cameras and portable data terminals, such as cellular phones and notebook computers. Thus, tri(ethylene glycol) allyl Me ether was hydrosilylated with 2,4,6,8tetramethylcyclotetrasiloxane in the presence of a platinum catalyst producing tetrafunctional tri(ethylene glycol)-substituted D4 monomer in 97.4% yield. The monomer was polymerized in the presence of 1,3-di(3-acryloyloxypropyl)-1,1,3,3-tetramethyldisiloxane terminating agent and sulfuric acid to obtain a polyoxyethylene-grafted acryloyloxy-terminated polysiloxane used as a crosslinkable component in solid polymer electrolyte compns.

7439-93-2D, Lithium, salts 7791-03-9

131718-86-0P 362060-08-0P 561065-47-2P 561065-48-3P

(monomer; production of oxyalkylene-containing acrylate-terminated polysiloxane crosslinking agents)

131718-86-0 HCAPLUS RN

AN

Cyclotetrasiloxane, 2,4,6,8-tetramethyl-2,4,6,8-tetrakis(4,7,10,13-tetraoxatetradec-1-yl)-

or cord=1

___ CH2__ CH2__ O__ CH2__ CH2__ O__ CH2__ CH2__ OMe

-- (CH2) 3-0-CH2-CH2-O-CH2-CH2-O-CH2-CH2-OMe

362060-08-0 HCAPLUS

Poly(oxy-1,2-ethanediyl), $\alpha,\alpha',\alpha'',\alpha'''$ -[(2,4,6,8-tetramethylcyclotetrasiloxane-2,4,6,8-tetrayl)tetra-3,1propanediyl]tetrakis[ω-methoxy-

PAGE 1-B

PAGE 1-B

2,5,8,11-Tetraoxadodecanoic acid, (2,4,6,8-tetramethylcyclotetrasiloxane-RN 561065-47-2 HCAPLUS CN 2,4,6,8-tetrayl)tetra-3,1-propanediyl ester

PAGE 1-A

PAGE 1-B

Me 0 CH2) 3-0-CH2-CH2-CH2-CH2-CH2-CH2-CH2-OME

RN 561065-48-3 HCAPLUS

CN Poly(oxy-1,2-ethanediyl), $\alpha,\alpha',\alpha'',\alpha'''-[(2,4,6,8-tetramethylcyclotetrasiloxane-2,4,6,8-tetrayl)tetrakis(3,1-propanediyloxycarbonyl)]tetrakis[<math>\omega$ -methoxy- (9CI) (CA INDEX NAME)

PAGE 1-A

PAGE 1-B

$$0 - CH_2 - CH_$$

IT 21324-40-3, Lithium hexafluorophosphate 33454-82-9,

Lithium trifluoromethanesulfonate

(oxyalkylene-containing acrylate-terminated polysiloxanes used in compns. for lithium secondary batteries)

RN 21324-40-3 HCAPLUS

CN Phosphate(1-), hexafluoro-, lithium (8CI, 9CI) (CA INDEX NAME)

F-P-F-

● Li *

RN 33454-82-9 HCAPLUS

Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)

F_ E_ SO3H

● Li

T7439-93-2D, Lithium, salts 7791-03-9
, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 29935-35-1, Lithium hexafluoroarsenate 90076-65-6, Lithium bis(trifluoromethylsulfonyl)imide

(oxyalkylene-containing acrylate-terminated polysiloxanes used in compns.

for lithium secondary batteries)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

p. 2 of 5

```
7791-03-9 HCAPLUS
     Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)
CN
     14283-07-9 HCAPLUS
                                                                                          p. 3 of 5
     Borate(1-), tetrafluoro-, lithium (8CI, 9CI) (CA INDEX NAME)
CN
     29935-35-1 HCAPLUS
RN
    Arsenate(1-), hexafluoro-, lithium (8CI, 9CI) (CA INDEX NAME)
     90076-65-6 HCAPLUS
RN
     Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,
CN
     lithium salt (9CI) (CA INDEX NAME)
      ● Li
     561065-50-7DP, acryloyloxy-terminated 561065-52-9DP,
IT
     acryloyloxy-terminated 561065-55-2DP, acryloyloxy-terminated
        (production of oxyalkylene-containing acrylate-terminated polysiloxane crosslinking agents)
RN
     561065-50-7 HCAPLUS
     Cyclotetrasiloxane, 2,4,6,8-tetramethyl-2,4,6,8-tetrakis(4,7,10,13-
CN
     tetraoxatetradec-1-yl)-, homopolymer (9CI) (CA INDEX NAME)
     CM
     CRN 131718-86-0
     CMF C44 H96 O20 Si4
                                                 PAGE 1-A
                                              (CH2)3-0-
 MeO-CH2-CH2-O-CH2-CH2-O-CH2-CH2-O-(CH2)3
          MeO_CH2_CH2_O_CH2_CH2_O_CH2_CH2_O_(CH2/3
```

PAGE 1-B

PAGE 1-B

$$-CH_2$$
 OMe

___ CH2_____ OME

RN 561065-55-2 HCAPLUS

CN Cyclotetrasiloxane, 2,4,6,8-tetramethyl-2,4,6,8-tetrakis(4,7,10,13-tetraoxatetradec-1-yl)-, polymer with $\alpha,\alpha',\alpha'',\alpha''$ '-[(2,4,6,8-tetramethylcyclotetrasiloxane-2,4,6,8-tetrayl)tetra-3,1-propanediyl]tetrakis[ω -methoxypoly(oxy-1,2-ethanediyl)]

CM 1

CRN 362060-08-0

CMF (C2 H4 O)n (C2 H4 O)n (C2 H4 O)n (C2 H4 O)n C20 H48 O8 Si4

CCI PMS

PAGE 1-B

CM 2

CRN 131718-86-0

CMF C44 H96 O20 Si4

PAGE 1-B

IT 18001-97-3P 104104-82-7P

(production of oxyalkylene-containing acrylate-terminated polysiloxane crosslinking agents)

RN 18001-97-3 HCAPLUS

I-Propanol, 3,3'-(1,1,3,3-tetramethyl-1,3-disiloxanediyl)bis-

P. 4 of 5

RN 104104-82-7 HCAPLUS

CN 1,2-Propanediol, 3,3'-[(1,1,3,3-tetramethyl-1,3-disiloxanediyl)bis(3,1-propanediyloxy)]bis- (9CI) (CA INDEX NAME)

IT 2370-88-9, 2,4,6,8-Tetramethylcyclotetrasiloxane 3277-26-7

, 1,1,3,3-Tetramethyldisiloxane

RL: RCT (Reactant); RACT (Reactant or reagent)

(production of oxyalkylene-containing acrylate-terminated polysiloxane

crosslinking agents)

RN 2370-88-9 HCAPLUS

CN Cyclotetrasiloxane, 2,4,6,8-tetramethyl-

RN 3277-26-7 HCAPLUS

CN Disiloxane, 1,1,3,3-tetramethyl- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

Me2SiH_O_SiHMe2

TT 17898-71-4P 561065-49-4P

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT

(Reactant or reagent)

(terminating agent; production of oxyalkylene-containing acrylate-terminated

polysiloxane crosslinking agents)

RN 17898-71-4 HCAPLUS

N 2-Propenoic acid, (1,1,3,3-tetramethyl-1,3-disiloxanediyl)di-3,1-

propanediyl ester (9CI) (CA INDEX NAME)

RN 561065-49-4 HCAPLUS

CN 2-Propenoic acid, (1,1,3,3-tetramethyl-1,3-disiloxanediyl)bis(3,1-propanediyloxy-3,1,2-propanetriyl) ester (9CI) (CA INDEX NAME)

PAGE 1-B

P. 5. of 5

L69 ANSWER 12 OF 36 HCAPLUS COPYRIGHT ACS on STN 2003:15537 DN 138:74288 ED Entered STN: 08 Jan 2003 AN Polymer electrolytes and polyethylene glycol-containing crosslinked polysiloxanes therefor ΤI JP priority-6/21/01 Iwatani, Keizo; Yoza, Akira; Oikawa, Takao; Yamamoto, Yasuhiro IN Chisso Corp., Japan PA APPLICATION NO. DATE JP pub - 1/8/03 KIND DATE PATENT NO. _____ ____ 20010621 JP 2001-188321 20030108 **A2** ΡI JP 2003002974

The electrolytes, showing good flexibility and high ion conductivity, comprise Li salts and crosslinked polysiloxanes having trifunctional Si and polyoxyethylene repeating units. The polysiloxanes may be represented by [X(OX2H4)q10Y1]nZm[(R2SiO)rSiO3/2]p [X = C1-6 alkyl; Y1 = C2-20 alkylene; Z = group both-ends-terminated with C2-20 alkylene; R = X1-6 alkyl; q1, n, m ≥1; r = 0, 1; p = 4-60; n + 2m = p]. Thus, triethylene glycol allyl Me ether 0.803, polyethylene glycol diallyl ether 0.748, and 1,3,5,7,9,11,13,15-octakis(dimethylsiloxy)pentacyclo[9.5.1.13,9 .15,15.1.7,13]octasiloxane 1.00 g were reacted at 80-120° in the presence of Ptdivinyltetramethyldisiloxane complex to give a crosslinked product, 0.1 g of which was reacted with 5.98 + 10-3 g LiClO4 in THF to give a solid electrolyte showing ion conductivity 1.8 + 10-5 S/cm and flexural modulus 0.53 MPa at room. temperature

IT Capacitors

IT

CN

(electrolytes for; high-ion-conductivity and flexible solid electrolytes of polyethylene glycol-containing POSS-Li complexes) 7439-93-2DP, Lithium, poly(ethylene oxide)-oligosilsesquioxane complexes, hydrochlorate-containing 481052-04-4DP, reaction products with triethylene glycol allyl Me ether, lithium complexes, hydrochlorate-containing

(high-ion-conductivity and flexible solid electrolytes of polyethylene glycol-containing POSS-Li complexes)

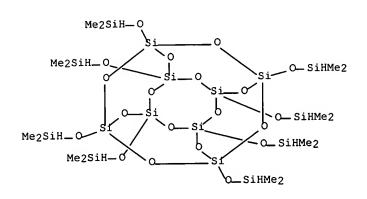
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

RN 481052-04-4 HCAPLUS

Pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane, octakis[(dimethylsilyl)oxy]-, polymer with α -2-propenyl- ω -(2-propenyloxy)poly(oxy-1,2-ethanediyl) (9CI) (CA INDEX NAME)

CM 1 CRN 125756-69-6 CMF C16 H56 O20 Si16



CM 2 CRN 59788-01-1 CMF (C2 H4 O)n C6 H10 O CCI PMS

L69 ANSWER 14 OF 36 HCAPLUS COPYRIGHT ACS on STN

2002:553509 DN 137:127526 ED Entered STN: 26 Jul 2002

Electrolyte composition with high ion conductivity and high ion transport number and nonaqueous electrolyte secondary batteries

IN Wariishi, Koji; Sen, Masakazu; Ono, Michio

Fuji Photo Film Co., Ltd., Japan PA

DATE PATENT NO. KIND

APPLICATION NO. DATE ----------

PI JP 2002208433 A2 20020726 PRAI JP 2000-323202 Α 20001023

JP 2001-325587 20011023

 $(L_{12}-R_{12})n1$

AN

No baking mentioned?

AB The compns. contain (A) \geq 1 compds. selected from I, R21L21A+(L22R22)(L23R23)(L24R24) X- and R31L31N+(L32R32):C[N(L33R33)(L34R3 4)][N(L35R35)(L36R36)] X- (Q = group for forming 5- or 6membered aromatic cation; L11-12, L21-24, L31-36 = (un)substituted alkylene(oxy) and/or alkenylene(oxy); R11-12, R21-24, R31-36 = H, OM(OR)n, may form ring; ≥ 1 of R11-12, R21-24, R31-36 = OM(OR)n; R = (un)substituted alkyl or aryl; M = Si, B, Ti, Al, Ge, Sn; n1 = 0, natural number; X- = anion) and (B) salts of Group IA or IIA ions. Preferable Markush structures for I are further specified. Also claimed are solid electrolyte compns. containing crosslinked compds. of component A, obtained by reaction of A with compds. having ≥2 nucleophilic groups in a mol., instead of component A. Nonaq. electrolyte secondary batteries with the said electrolyte compns. are also claimed. Batteries with high capacity and excellent cycle characteristics are obtained. IT 7439-93-2DP, Lithium, polyoxyalkylene-ionene polymer complexes 444046-12-2DP, lithium complex

(ammonium compound-Li salt mixts. or their crosslinked solids as electrolytes for nonaq. secondary batteries)

RN 444046-12-2 HCAPLUS

CN

1H-Imidazolium, 1-methyl-3-[2-[(triethoxysilyl)oxy]ethyl]-, salt with 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]methanesulfonamide (1:1), polymer with 7,7,9,9-tetramethyl-3,6,8,10,13-pentaoxa-7,9disilapentadecane-1,15-diol (9CI) (CA INDEX NAME)

CM CRN 61854-15-7 CMF C12 H30 O7 Si2

a or c or d=1 b=0

CM CRN 444045-88-9 CMF C12 H25 N2 O4 Si . C2 F6 N O4 S2

> CM 3 CRN 444045-87-8 CMF C12 H25 N2 O4 Si

【0056】上記求核剤の添加量は、電解質組成物全体に対して0.1~70%質量%が好ましく、0.3~50質量%がより好ましく、0.5~30質量%が特に好ましい。求核剤を添加した際の反応温度は0~150℃とするのが好ましく、10~100℃とするのがより好ましい。また、求核剤の反応時間は好ましくは5分から2日、より好ましくは10分から1日である。なお、反応温度及び反応時間は特に限定されることはなく、所望の反応速度に応じて適宜選択できる。

【0057】本発明の電解質組成物は、ポリマー添加、オイルゲル化剤添加、多官能モノマー類を含む重合、ポリマーの架橋反応等の手法により、ゲル化(固体化)させて使用することもできる。ポリマー添加によりゲル化 40 させる場合は、Polymer Electrolyte Reviews, 1及び2(J. R. MacCallumとC. A. Vincentの共編、ELSEVIER APPLIED SCIENCE)に記載の化合物等を使用することができる。特に、ポリアクリロニトリル、ポリフッ化ビニリデン、ポリエチレンオキサイド、ポリシロキサン等が好適に用いられる。オイルゲル化剤添加によりゲル化させる場合は、工業科学雑誌(J. Chem Soc. Japan, Ind. Chem. Sec.), 46,779(1943)、J. Am. Chem. Soc., 111,5542(1989)、J. Chem. Soc., Chem. Commun., 199

- *6)、Chem. Lett., 1996, 885、J. Chem. Soc., Chem. Commun., 1997, 545等に記載されている化合物を好適に
- 30 用いることができる。中でも分子構造中にアミド構造を 有する化合物がより好ましい。

【0058】[2] 非水二次電池

次に、本発明の電解質が好ましく用いられる二次電池ついて説明する。本発明の二次電池は、正極シートと負極シートを隙間を設けて積層し、当該隙間に本発明の電解質組成物を充填したものである。

【0059】正極シートは、集電体上に正極活物質を含む電極合剤を塗布したものであり、負極シートは、集電体上に負極活物質を含む電極合剤を塗布したものである。 い下 である トルガロ ちょう かいま

0 る。以下、正極シート及び負極シートの材料について詳細に説明する。

【0060】(A) 集電体

正極シート・負極シートの集電体としては、構成された 電池において化学変化を起こさない電子伝導体が用いら れる。

好適に用いられる。オイルゲル化剤添加によりゲル化さ 【 0 0 6 1 】正極シートの集電体としては、アルミニウ せる場合は、工業科学雑誌(J. Chem. Soc., Japan, Ind. ム、ステンレス鋼、ニッケル、チタンなどの他にアルミ こウムやステンレス鋼の表面にカーボン、ニッケル、チ 11, 5542(1989)、J. Chem. Soc., Chem. Commun., 199 タンあるいは銀を処理させたものが好ましく、特に好ま 3, 390、Angew. Chem. Int. Ed. Engl., 35, 1949 (199 * 50 しいのはアルミニウム、アルミニウム合金である。

Re: Claim 4

L69 ANSWER 15 OF 36 HCAPLUS COPYRIGHT ACS on STN

AN 2001:718125 HCAPLUS Full-text

DN 135:273945

ED Entered STN: 02 Oct 2001

TI Crosslinkable polymer-based electroconductive coatings, waterproof electric conductors, and their manufacture

IN Saito, Takashi; Uzawa, Masashi

PA Mitsubishi Rayon Co., Ltd., Japan

PATENT NO. KIND DATE APPLICATION NO. DATE

PI JP 2001270999 A2 20011002 JP 2000-362863 20001129

PRAI JP 2000-14099 A 20000119

OS MARPAT 135:273945

The coatings, useful for batteries, capacitors, chemical sensors, etc., comprise (a) water-soluble electroconductive polymers bearing sulfonic acid groups and/or carboxyl groups, (b) solvents, (c) silane coupling agents YXSiR43R44R45 [R43, R44, R45 = H, C1-6 alkyl(oxy), amino, acetyl, Ph, halo; X = (CH2)n or (CH2)nO(CH2)m (n, m = 0-6 integer); Y = OH, thiol, amino, and/or epoxyl, and optional (d) colloidal SiO2 with grain size of 1-300 nm. The polymers may have skeleton of (phenylene)vinylene, thienylene, pyrrolylene, (imino)phenylene, isothianaphthene, furylene, and/or carbazolylene (Markush given). The polymers may be prepared by oxidative polymerization of alkoxy-substituted aminobenzenesulfonic acids, their alkali metal salts, and/or their (substituted) ammonium salts in basic solns. The coatings are formed on supports and treated at ordinary temperature-250°. Thus, an aqueous composition of 5:1 (part) 2-aminoanisole-4-sulfonic acid homopolymer/γ- glycidoxypropyltrimethoxysilane was applied on a glass plate and treated at 25° to give a coating showing surface resistivity 5.0 + 105 Ω/.box. and good water resistance.

IT 919-30-2, γ-Aminopropyltriethoxysilane

(coupling agents; sulfonic acid- and/or carboxyl-bearing conducting polymers for waterproof antistatic coatings)

RN 919-30-2 HCAPLUS

CN 1-Propanamine, 3-(triethoxysilyl)- (9CI) (CA INDEX NAME)

OEt EtO__ \$i__ (CH₂) 3__ NH₂ . or or c or d = 1 b = 0

OEt = alkoxygroup

```
L69 ANSWER 20 OF 36 HCAPLUS COPYRIGHT ACS on STN
     1998:406008 DN 129:82389 ED Entered STN: 02 Jul 1998
ΑN
     Copolyethers and solid polymer electrolytes and secondary batteries
TΙ
     Watanabe, Masayoshi; Miura, Katsuhito; Yanagida, Masanori; Higobashi,
IN
     Daiso Co., Ltd., Japan
PA
                                           APPLICATION NO.
                               DATE
                        KIND
     PATENT NO.
                                                                 _____
                               _____
                        ____
                                                                 19971208
                               19980618
                                           WO 1997-JP4499
PΙ
     WO 9825990
                         Α1
                                                                 19971208
                                           CA 1997-2244904
                               19980618
                         AA
     CA 2244904
                                                                 19971208
                               19981223
                                           EP 1997-946152
                        A1
     EP 885913
                        В1
                               20030416
     EP 885913
                                           CN 1997-192119
                                                                 19971208
                               19990310
                        Α
     CN 1210548
                               20021120
                        В
     CN 1094494
                                           TW 1997-86118417
                                                                 19971208
     TW 444044
                        В
                               20010701
                                                                 19971208
                               20011029
                                           JP 1998-526483
                        B2
     JP 3223978
                                           US 1998-101971
                                                                 19980730
                        В1
                               20010130
     US 6180287 >
                         A
                               19961209
PRAI JP 1996-328422
                        A
W
                               19961225
     JP 1996-345244
     WO 1997-JP4499
                               19971208
     Solid polymer electrolytes prepared by blending (1) copolyether comprising a main chain derived
AB
     from ethylene oxide mols. and a side chain having two oligooxyethylene groups with (2) an
     electrolytic salt and, if necessary, (3) a plasticizer selected from aprotic organic solvents,
     derivs. and metal salts of polyalkylene glycols having Mn 200-5000, and metal salts of the
     derivs. are superior to the solid electrolytes of the prior art in ionic conductivity and
     excellent in processability, moldability and mech. strengths. Secondary batteries can be
     produced by combining the solid polymer electrolytes with a neg. electrode of metallic lithium
     and a pos. electrode of cobalt lithium. 2-Glycidoxy-1,3-bis(2- methoxyethoxy)propane and
     ethylene oxide were copolymd. and cast together with LiClO4 to give a film with elec.
     conductivity 8.7 x 10-4 S/cm.
     7439-93-2D, Lithium, polyoxyalkylene complexes, uses 7791-03-9, Lithium perchlorate
ΙT
        (copolyethers and solid polymer electrolytes and secondary batteries)
     31900-57-9D, Dimethylsilanediol homopolymer, trimethylsilyl-
IT
     terminated 42557-10-8, Polyoxydimethylsilylene, trimethylsilyl-
     terminated 156118-35-3D, Dimethylsilanediol-methylsilanediol
     copolymer, trimethylsilyl-terminated
        (copolyethers and solid polymer electrolytes and secondary batteries)
     42557-10-8 HCAPLUS
RN
     Poly[oxy(dimethylsilylene)], \alpha-(trimethylsilyl)-\alpha-
CN
     [(trimethylsilyl)oxy]- (9CI) (CA INDEX NAME)
 Me3Si 0 \sin 0 SiMe3
     156118-35-3 HCAPLUS
RN
     Silanediol, dimethyl-, polymer with methylsilanediol (9CI) (CA INDEX NAME)
CN
     CRN 43641-90-3
                                    looks like a or c or d = 1
b = 0
     CMF C H6 O2 Si
     ОН
  HO_SiH_CH3
```

CM

2 CRN 1066-42-8 CMF C2 H8 O2 Si

```
L133 ANSWER 13 OF 19 WPIX COPYRIGHT THE THOMSON CORP on STN
                                                                              b =
    1999-573642 [49] DNN N1999-422963
                                              DNC C1999-167488
    Polyether copolymer and crosslinked solid polymer electrolyte.
    HIGOBASHI, H; MIURA, K; NAKAMURA, S; YANAGIDA, M
IN
                                                                           a ≥ 1 and also cord ≥1
     (OSAS) DAISO CO LTD
PA
                    A1 19990929 (199949)* EN
                                                     C08G065-14
    EP 945476
PΤ
                    A 19991005 (199953)
A 20001212 (200067)
                                                     C08G065-24
                                               14
     JP 11269263
                                                     H01G001-74
    US 6159389
                                              . 13
                    B2 20020715 (200253)
                                                     C08G065-24
     JP 3301378
                    B1 20040303 (200417) EN
                                                     C08G065-14
    EP 945476
                    E 20040408 (200425)
                                                     C08G065-14
    DE 69915148
PRAI JP 1998-75409
                         19980324
           945476 A UPAB: 19991124
AB
     EP
```

NOVELTY - A copolymer obtained by combining epipchlorohydrin, ethylene oxide, and a crosslinkable oxirane compound gives a solid electrolyte of superior ionic conductivity without plastic deformation or flow at high

DETAILED DESCRIPTION - A polyether copolymer having a weight average molecular weight, Mw, of 104 to 107 comprises (mol.%):

- (A) a repeating unit of formula (I) (4-40 mol.%);(B) a repeating unit derived from a monomer of formula (II) (59-95 mol.%); and
- (C) a repeating unit derived from a monomer of formula (IIIA or IIIB) (0.001-15 mol.%):
- R1 and R2 = substituent containing an ethylenically unsaturated group, a reactive silicon group or a terminal epoxy group of formula (IV):

R3 = a divalent organic residue comprising at least one C, O, or H.

INDEPENDENT CLAIMS are included for:

- (1) a crosslinked material obtained by utilizing the reactivity of a crosslinking component of the polyether copolymer, of an ethylenically unsaturated group of the copolymer, the Si group, or the side chain epoxy group;
- (2) a crosslinked solid polymer obtained by mixing a crosslinking material crosslinked by utilizing the reactivity of a crosslinking monomer component of the polyether copolymer with an electrolyte salt compound;
 - (3) a battery comprising the crosslinked solid polymer electrolyte.
- USE The solid electrolyte is useful for batteries, capacitors, sensors, electrochromic devices, and as an antistatic agent for rubber and plastics.

ADVANTAGE - S - The solid electrolyte has superior processability, moldability, mechanical strength,

flexibility, and heat resistance.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Components: The polyether copolymer has a weight average molecular weight 105 to 5.106, comprising 9-30 mol.% of (A) 90-69 mol.% of (B) and 0,.0-10 mol.% of (C). (C) is at least one crosslinking component selected from allyl glycidyl-,

allyl phenyl glycidyl-, or vinyl glycidyl ether, glycidyl (meth)acrylate-, sorbate-, cinnamate-, or crotonate, Component (C) is at least one monomer selected from: 3-glycidylpropyltrimethoxysilane, 3glycidoxypropylmethyldimethylsilane, 4-(1,2- epoxy)butyltrimethoxysilane, 5-(1,2-epoxy)pentyltrimethoxysilane, or 2-(3,4-epoxycyclohexyl)ethyltrimethoxysilane, or 2,3-epoxypropyl-2,3-2-methylpropyl-, ethylene glycol-2,3-epoxypropyl-2,3-epoxypropyl-2,3-epoxy-2-methyl propyl ether, 2-methyl-1,2,3,4-diepoxybutane, 2-methyl-1,2,3,4-diepoxypentane, hydroquinone-2,3-epoxypropyl-2,3-methyl propyl-, and catechol-2,3-epoxypropyl-2,3-epoxy-22-methyl propyl ether. The crosslinking is obtained by utilizing a radical initiator selected from an organic peroxide and an azo compound, or crosslinking by using active energy radiation, i.e. UV or electron radiation, a hydrosilation reaction with a compound having at least two Si hydride groups, crosslinking by using polyamines or acid anhydrides. The crosslinked solid polymer electrolyte is obtained by mixing a crosslinked material obtained by utilizing the reactivity of a reactive Si group, a reactive side chain epoxy group, of the polyether copolymer with an electrolyte salt compound. The electrolyte salt compound is a crosslinked solid polymer electrolyte where the electrolyte salt compound is a compound composed of a cation selected from a metal cation, an ammonium, amidinium, or guanidinium ion, and an anion selected from chloride, bromide, iodide, perchlorate, thiocyanate, tetrafluoroborate, nitrite, AsF6-, PF6-, strearylsulfonate, octylsulfonate, dodecyl benzenesulfonate, naphthalenesulfonate, dodecylnaphthalene, 7,7,8,8-tetracyano-p-quinodimethane, X1SO3-, (X1SO2(X2SO2)N)-, (X1SO2)(X2SO2)(X3SO2)C)-, and ((X1SO2)(X2SO2)YC)-. X1, X2, and X3 = 1-6 C perfluoroalkyl, Y = nitro, nitroso, carbonyl, carboxyl, or cyano, and X1, X2, X3, and Y = an electron attractive group. The metal cation is selected from Li, Na, Rb, Co, Ni, Cu, Zn, Mn, Fe, Co, Ni, Cu, Zn, and Ag, or from a transition metal. The formulation ratio of the electrolyte salt compound to the polyether copolymer is such that the molar ratio of the number of moles of electrolyte salt compound to the total number of moles of ether oxygen in the polyether copolymer is 0.0001-5. ABEX EP 945476 A1 UPTX: 19991124

EXAMPLE - After replacing the atmosphere in a 4-neck flask by nitrogen, ethylene oxide (100 g) was added gradually to a mixture of allyl glycidyl ether catalyst (11 g), epichlorohydrin (81 g), and nhexane (500 g) in the flask, and polymerization was carried out for 20 hours at 20degreesC, and terminated with methanol.

The polymer was isolated by decantation, dried at 40degreesC at normal pressure over 10 hours, to give 185 g of polymer, Tg of -32degreesC, Mw of 1,300,000, heat of fusion 29 J/g. The polymer (1 g) and dicumyl peroxide (0.015 g) as crosslinking agent were dissolved in acetonitrile (5 ml), and the resultant solution was mixed with lithium perchlorate (electrolyte salt compound) so that a molar ratio of electrolyte salt compound to the total number of moles of copolymer ether oxygen was 0.05. This solution was cast on a polytetrafluoroethylene mold, followed by drying and

further heating under nitrogen at 150 degrees C over 3 hours, to give a film.

The flexibility and conductivity values of the film were not broken and 2.2 x 10-6 respectively. The corresponding values for a similar film obtained without using a crosslinking agent were broken and 5.7.10-9, i.e. the conductivity of the second film was much less than that of the first.

CMC UPB 19991124 M3 *11* B414 B712 B713 B720 B741 B742 B743 B744 B760 B796 B798 B799 B832 B833 M210 M211 M212 M213 M214 M215 M216 M220 M221 M222 M223 M224 M225 M226 M231 M232 M233 M250 M272 M281 M282 M283 M320 M411 M510 M520 M530 M540 M620 M781 M782 M904 M905 Q132 Q454 R023

cyclohexanone, 2, 6-bis(4-azidobenzal) 4-methylcyclohexanone, 4, 4'-diazidostilbene-2, 2'-disulfonic acid, 1,3-bis (4'-azidobenzal)-2-propanone-2'sulfonic acid and 1,3-bis (4'-azidocinnacylidene)-2propanone.

As a crosslinking aid, there can be optionally used ethylene glycol diacrylate, diethylene glycol diacrylate, triethylene glycol diacrylate, polyethylene glycol diacrylate, ethylene glycol dimethacrylate, diethylene glycol dimethacrylate, triethylene glycol dimethacrylate, polyethylene glycol dimethacrylate, oligoethylene glycol diacrylate, oligoethylene glycol dimethacrylate, propylene glycol diacrylate, propylene glycol dimethacrylate, oligopropylene glycol diacrylate, oligopropylene glycol dimethacrylate, 1, 3-butylene glycol diacrylate, 1, 4-butylene glycol diacrylate, 15 1, 3-glycerol dimethacrylate, 1, 1, 1-trimethylolpropane dimethacrylate, 1, 1, 1-trimethylolethane diacrylate, pentaerythritol trimethacrylate, 1, 2, 6-hexanetriacrylate, sorbitol pentamethacrylate, methylenebisacrylamide, methylenebismethacrylamide divinyl benzene, vinyl methacrylate, vinyl crotonate, vinyl acrylate, vinyl acetylene, trivinyl benzene, triallyl cyanyl sulfide, divinyl ether, divinyl sulfo ether, diallyl phthalate, glycerol trivinyl ether, allyl methacrylate, allyl acrylate, diallyl maleate, diallyl fumarate, diallyl itaconate, methyl methacrylate, butyl acrylate, ethyl acrylate, 2-ethylhexyl acrylate, lauryl methacrylate, ethylene glycol acrylate, triallyl isocyanurate, maleimide, phenylmaleimide, N.N-mphenylenebismaleimide, p-quinonedioxime, maleic anhydride and itaconic acid.

As a crosslinking agent having a silicon hydride group, which is used for crosslinking the ethylenically unsaturated group, a compound having at least two silicon hydride groups can be used. Particularly, a polysiloxane compound or a polysilane compound is preferable.

Examples of the polysiloxane compound include a linear polysiloxane compound represented by the formula (a-1) or (a-2), or a cyclic polysiloxane compound represented by the formula (a-3).

In the formulas (a-1) to (a-3), R^{11} , R^{12} , R^{13} , R^{14} , R^{15} , R^{16} , R^{17} , R^{18} and R^{19} respectively represent a hydrogen atom or an alkyl or alkoxy group having 1 to 12 carbon atoms; and q and r are an integer provided that $r \ge 2$, $q \ge 0$, $2 \le q + r \le 300$. As the alkyl group, a lower alkyl group such as a methyl group and an ethyl group is preferable. As the alkoxy group,

a lower alkoxy group such as a methoxy group and an ethoxy group is preferable.

As the polysilane compound, a linear polysilane compound represented by the formula (b-1) can be used.

In the formula (b-1), R^{20} , R^{21} , R^{22} , R^{23} and R^{24} respectively represent a hydrogen atom or an alkyl or alkoxy group having 1 to 12 carbon atoms; and s and t are an integer provided that $t \ge 2$, $s \ge 0$, $2 \le s + t \le 100$.

Examples of the catalyst of the hydrosilylation reaction include transition metals such as palladium and platinum or a compound or complex thereof Furthermore, peroxide, amine and phosphine can also be used. The most popular catalyst includes dichlorobis(acetonitrile)palladium(II), chlorotris(triphenylphosphine)rhodium(I) and chloroplatinic acid.

As the crosslinking method of the copolymer wherein the reactive functional group is a reactive silicon group, the crosslinking can be conducted by the reaction between the reactive silicon group and water. In order to increase the reactivity, there may be used, as a catalyst, organometal compounds, for example, tin compounds such as dibutyltin dilaurate, dibutyltin maleate, dibutyltin diacetate, tin octylate and dibutyltin acetylacetonate; titanium compounds such as tetrabutyl titanate and tetrapropyl titanate; aluminum compounds such as aluminum trisacetyl acetonate, aluminum trisethyl acetoacetate and diisopropoxyaluminum ethylacetoacetate; or amine compounds such as butylamine, octylamine, laurylamine, dibutylamine, monoethanolamine, diethanolamine, triethanolamine, diethylenetriamine, trietylenetetraamine, cyclohexylamine, benzylamine, diethylaminopropylamine, guanine and diphenylguanine.

As the crosslinking method of the copolymer wherein the 40 reactive functional group is an epoxy group, polyamines, acid anhydrides and the like can be used.

Examples of the polyamines include aliphatic polyamines such as diethylenetriamine, dipropylenetriamine, triethylenetetramine, tetraethylenepentamine, dimethylaminopropylamine, diethylaminopropylamine, dibutylaminopropylamine, hexamethylenediamine, Naminoethylpiperazine, bis-aminopropylpiperazine, trimethylhexamethylenediamine and dihydrazide isophthalate; and aromatic polyamines such as 4, 4'-diaminodiphenyl sulfone, m-phenylenediamine, 2, 4-toluylenediamine, m-toluylenediamine, o-toluylenediamine and xylylenediamine. The amount of the polyamine varies depending on the type of the polyamine, but is normally within the range from 0.1 to 10% by weight based on the whole composition constituting the solid polymer electrolyte.

Examples of the acid anhydrides includes maleic anhydride, dodecenylsuccinic anhydride, chlorendic anhydride, phthalic anhydride, pyromellitic anhydride, 60 hexahydrophthalic anhydride, methylhexahydrophthalic anhydride, tetramethylenemaleic anhydride, tetrahydrophthalic anhydride, methyltetrahydrophthalic anhydride and trimellitic anhydride. The amount of the acid anhydrides varies depending on the type of the acid anhydride, but is normally within the range from 0.1 to 10% by weight based on the whole composition. In the crosslinking, an accelerator can be used. In the crosslinking reaction of polyamines,

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L69 ANSWER 3 OF 36 HCAPLUS COPYRIGHT ACS on STN
                       140:202430 ED Entered STN: 27 Feb 2004
     2004:161244 DN
AN
     Salts of pentacyclic or tetrapentalene derived anions, and their uses as
TI
     ionic conductive materials
     Armand, Michel; Michot, Christophe; Gauthier, Michel; Choquette, Yves
IN
     Hydro-Quebec, Can.; Centre National De La Recherche Scientifique (CNRS)
PA
                           KIND
                                  DATE
                                               APPLICATION NO.
                                                                         DATE
     PATENT NO.
                                  _____
                                                _____
    US.6120696
US.6171522
                              20000919
                                                                19980828
                        A
                                        US 1998-125792
                                                                 19981119
                        B1
                              20010109
                                          US 1998-101811
                                                                19981119
    US 6333425
                        B1
                              20011225
                                          US 1998-101810
    USI 6228942
US 6395367
                              20010508
                                         US 1998-125798
                                                                19981202
                        B1
                                                                 19981202
                              20020528
                                          US 1998-125799
                        R1
     US 6319428
                        B1
                              20011120
                                          US 1998-125797
                                                                 19981203
     บริ 63 65 0 68
                                          US 2000-609362
                                                                20000630
                              20020402
                        B1
                                                                 20000809
     US 6576159
                        B1
                              20030610
                                          US 2000-638793
     US 2001024749
                                          US 2001-826941
                                                                 20010406
                        A 1
                              20010927
     US 6506517
                         B2
                              20030114
                                                                             No
mention
of
baking?
                              20020124
                                          US 2001-858439
                                                                 20010516
    US 2002009650
                        A1
                                                                 20020327
     US 2002102380
                         A1
                              20020801
                                          US 2002-107742
                              20030320
                                          US 2002-253035
                                                                 20020924
     US 2003052310
                        A1
                                          US 2002-253970
                                                                 20020924
     US 2003066988
                         A1
                              20030410
PRAI CA 1996-2194127
                        Α
                              19961230
                              19981119
     US 1998-101810
                        A3
                              19981119
     US 1998-101811
                         A3
                              19981202
     US 1998-125798
                         A3
                               19981202
     US 1998-125799
                         A3
     US 1998-125797
                         A1
                               19981203
     US 2000-638793
                         A1
                               20000809
     US 2001-858439
                         A1
                              20010516
      This invention describes ionic compds. where the anionic charge is delocalized. One compound of the
AB
      invention contains an anionic part associated with at least one mono- or multivalent cationic part Mm+, in a
      number sufficient to ensure electronic neutrality of the material. M can be a hydronium, nitrosyl NO+, an
      ammonium NH4+, a metallic cation with valence m, an organic cation having a valence m, or an organometallic
      cation having valence m. The anionic charge is carried by a new pentacyclic moiety or derivative of
      tetrapentalene carrying electroattractive substituents. The compds. are used notably for ionic conduction,
      electronic conductors, dyes and colorants, and catalysts for diverse chemical reactions.
     They can also be used as electrolytes in fuel cells and batteries.
TT
     Polyoxyalkylenes, processes
        (electrolyte complexes with lithium salts
IT
     Secondary batteries
     Polymer electrolytes
ΙT
ΙT
     Alkali metal salts
     7580-67-8, Lithium hydride
IT
        (salts of pentacyclic or tetrapentalene derived anions, and
        their uses as ionic conductive materials)
     156118-35-3DP, 2-(5-cyano-1,3,4-triazole)-4,4-difluorobutyl-, lithium salt
IT
         (surfactant and antistatic; salts of pentacyclic or tetrapentalene
         derived anions, and their uses as ionic conductive materials)
     156118-35-3 HCAPLUS
RN
     Silanediol, dimethyl-, polymer with methylsilanediol
CN
     CM
         1
     CRN 43641-90-3
     CMF C H6 O2 Si
          OH
  но_ він_ снз
     CM
     CRN 1066-42-8
          C2 H8 O2 Si
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L69 ANSWER 17 OF 36 HCAPLUS COPYRIGHT ACS on STN

W

AN 2000:442060 DN 133:46207 ED Entered STN: 30 Jun 2000

TI Microporous solid electrolytes for lithium secondary batteries

19991221

IN Jang, Dong Hun; Kim, Sa Heum; Kim, Han Jun; Hong, Sung Min

PA Finecell Co., Ltd., S. Korea

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	No
						and m
PI	WO 2000038263	A1	20000629	WO 1999-KR798	19991221	men tron
	EP 1171927	A1	20020116	EP 1999-960009	19991221	of baking.
	JP 2002543554	T2	20021217	JP 2000-590241	19991221	of baking
PRA	KR 1998-57031	A	19981222			•

The present invention relates to a solid electrolyte having a good conductivity to lithium ion by allowing the liquid components and lithium salts to be absorbed into the electrolyte film containing an absorbent added at the time of its preparation and having a porosity, a process for preparing the same and a rechargeable lithium cell using the same as an electrolyte. As the absorbent, inorg. materials having not more than 40 µm of particle size can be used. As the polymer binder, any binder whose solubility against the liquid electrolyte is small can be used. A wet process can introduce the porous structure of the electrolyte film. The solid electrolyte according to the present invention has the ionic conductivity of more than approx. 1 to 3 \times 10-3 S/cm at room temperature and low reactivity to lithium metal. The cell is fabricated from the solid electrolyte together with electrodes by lamination or pressing methods and, the liquid electrolyte, which is decomposed by moisture, is introduced to a cell just before packaging. Therefore, the solid electrolyte according to the present invention is not affected by the humidity and temperature conditions during the manufacturing of the electrolyte film. In addition, the solid electrolyte according to the present invention has high thermal, mech. and electrochem. stability, and thus is suitable as an electrolyte for rechargeable lithium cells. 9016-00-6, Polydimethylsiloxane ΙT

(binder; microporous solid electrolytes for lithium secondary batteries)

RN 9016-00-6 HCAPLUS

WO 1999-KR798

CN Poly[oxy(dimethylsilylene)] (8CI, 9CI) (CA INDEX NAME)

IT 556-65-0, Lithium thiocyanate 7791-03-9, Lithium perchlorate 12162-79-7, Lithium manganese oxide limno212190-79-3, Cobalt lithium oxide colio2 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate (microporous solid electrolytes for lithium secondary batteries)

```
L69 ANSWER 18 OF 36 HCAPLUS COPYRIGHT ACS on STN
     2000:17088 DN 132:152905 ED Entered STN: 09 Jan 2000
AN
     Synthesis and characterisation of poly(methylalkoxysiloxane) solid polymer
TI
                                                                                             No
     electrolytes incorporating different lithium salts
                                                                                             men tron
ΑΠ
     Morales, E.; Acosta, J. L.
     Instituto de Ciencia y Tecnologia de Polimeros, CSIC, Madrid, 28006, Spain
CS
SO
     Electrochimica Acta (1999), 45(7), 1049-1056
     CODEN: ELCAAV; ISSN: 0013-4686
PB
     Elsevier Science Ltd.
LA
     English
      Two comb polymers with oligo-oxyethylene side chains of the type -O-(CH2-CH2-O)n-CH3 were
AB
      prepared from poly(methylhydrosiloxane) (PMHS). Homogeneous polymer electrolytes were made from
      the two synthesized polymers and four lithium salts having different chemical structures, such as
      lithium perchlorate (LiClO4), lithium trifluoromethanesulfonate (LiCF3SO3), lithium
      hexafluorophosphate (LIPF6) and lithium bis(trifluoromethane sulfonylimide) (LiN(SO2CF3)2) by
      solvent casting method, and their thermal, elec. and electrochem. properties measured as a
      function of temperature Results indicate that polymer electrolyte complexes are amorphous
      materials, and that its properties depend on the oligo-oxyethylene chain length as well as on the
      chemical nature of the lithium salt.
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     7791-03-9P, Lithium perchlorate 21324-40-3P, Lithium hexafluorophosphate
    33454-82-9P, Lithium trifluoromethanesulfonate
     7439-93-2DP, Lithium, complexes with poly(methylalkoxysiloxanes), uses 9004-73-3DP,
Methylsilanediol homopolymer, SRU, reaction products with triethylene glycol Me ether, complexes with
lithium 49718-23-2DP, Methylsilanediol homopolymer, reaction products with triethylene glycol Me
ether, complexes with lithium
     9004-73-3 HCAPLUS
     Poly[oxy(methylsilylene)] (8CI, 9CI) (CA INDEX NAME)
CN
                                                                        Claim 1 structures
     49718-23-2 HCAPLUS
RN
     Silanediol, methyl-, homopolymer (9CI) (CA INDEX NAME)
CN
     CM
     CRN 43641-90-3
     CMF C H6 O2 Si
```

OH HO_SIH_CH3

L100 AN DN ED	ANSWER 3 OF 4 1995:996372 HC 124:90491 Entered STN: 2	CAPLUS <u>Full-</u>		on STN	Same Assignee	
TI	High-solids, cu	rable coati	ng composit:	ions	, , ,	
IN	Miyazoe, Seigo;	Fushimi, A	kira; Inoue	, Masanobu		
PA	Nippon Paint Co PATENT NO.	KIND	pan DATE	APPLICATION NO.	DATE	No
PI	WO 9527010 AU 9520844	A1 A1	19951012 19951023	WO 1995-JP618 AU 1995-20844	19950331 19950331	No mention.
	EP 754209 EP 754209	A1 B1	19970122 19980902	EP 1995-913392	19950331	<i>(1)</i>
	JP 10503534 JP 3280031	T2 B2	19980331 20020430	JP 1995-525563	19950331	baking.
	CA 2185681 CA 2185681	C AA	20031202 19951012	CA 1995-2185681	19950331	No.
ד ג פפ		A A	19981229 19940401	US 1996-718504	19961108	
LVAI	WO 1995-JP618	W	19950331			
7 17	Aminamlast fro	a +i+la aam	nne contair	5-808 nolimor con	taining trop and be	TETTTEM CATHOLY

Aminoplast-free title compns. contain 5-80% polymer containing free and esterified carboxyl groups and having an acid value 50-300 mg KOH/g, 1-80% (meth)acrylic polymer containing hydroxyl and epoxy groups and having an epoxy equivalent of 200-1000 and a hydroxyl equivalent of 250-1500, and 1-50% alkoxy and(or) epoxy group-containing silicon polymer. A typical solventborne composition with solids content 49.5% contained 70% 25.7:109:325:240:300 acrylic acid-2-ethylhexyl acrylate-iso-Bu acrylate-maleic anhydride-styrene copolymer solution 36.4, 77% 340:229:231:200 cyclohexyl acrylate-glycidyl methacrylate-4-hydroxybutyl acrylate-Veova 9 copolymer solution 58.6, (SiR1R2O)5(SiR3R4R5O1/2)4(SiR6O3/2)2 (R1 = R3 = R4 = Me, R2 = R4 = MeO/BuO = 1/1, R5 = MeO/γ-glycidyloxypropyl = 1/1) (epoxy equivalent 625, alkoxy equivalent 83) 5, tert-butylammonium glycolate 1, dibutyltin bis(Bu malate) 1, tri-Et orthoformate 2, surface conditioner 1.5, Tinuvin 900 2, and Tinuvin 123 1 part.

RN 172822-34-3 HCAPLUS

CMF C H4 O

CN Neononanoic acid, ethenyl ester, polymer with cyclohexyl

2-methyl-2-propenoate, α-(dimethoxymethylsilyl)-ω[(dimethoxymethylsilyl)oxy]poly[oxy(methoxymethylsilylene)],
ethenylbenzene, 2-ethylhexyl 2-methyl-2-propenoate, 2,5-furandione,
4-hydroxybutyl 2-propenoate, 2-methylpropyl 2-methyl-2-propenoate,
oxiranylmethyl 2-methyl-2-propenoate and 2-propenoic acid, methyl ester

oxiranylmethyl 2-methyl-2-propenoate and 2-propenoic acid, methyl ester

CM 1

CRN 67-56-1

metal Salt

Н3С⊸ОН

CM 2
CRN 174450-49-8
CMF (C12 H22 O2 . C11 H20 O2 . C10 H16 O2 . C8 H8 . C7 H12 O3 . C7 H12 O2 . C7 H10 O3 . C4 H2 O3 . C3 H4 O2 . (C2 H6 O2 Si)n C6 H18 O5 Si2)x
CCI PMS

CM 3
CRN 172682-46-1
CMF (C2 H6 O2 Si)n C6 H18 O5 Si2
CCI PMS

L100 ANSWER 2 OF 4 HCAPLUS COPYRIGHT ACS on STN

AN 1995:997340 DN 124:120302 ED Entered STN: 22 Dec 1995

TI Curable resin compositions for top coatings

IN Miyazoe, Seigo; Ito, Etsuyuki; Fushimi, Akira; Inoue, Masanobu

PA Nippon Paint Co., Ltd., Japan

L	Hippon ruine co, /		-F		
	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
ΡI	WO 9528452	A1	19951026	WO 1995-JP757	19950418
	CA 2186008	AA	19951026	CA 1995-2186008	19950418
	AU 9522250	A1	19951110	AU 1995-22250	19950418
	EP 756614	A 1	19970205	EP 1995-915342	19950418
	EP 756614	В1	19981223		
	JP 10503787	Т2	19980407	· JP 1995-526871	19950418
	JP 3148246	B2	20010319	,	
	US 5760137	A	19980602	US 1996-727464	19961203
PRAI	JP 1994-104525	A	19940419		
	JP 1994-104526	A	19940419		

Same. Assignee

19950418 WO 1995-JP757 High-solids, curable resin compns. having an good storage stability, that provide top coatings AB with good mar, acid, and water resistance in 2-coat, 1-bake processes contain 5-70% polymer containing free and esterified carboxyl groups and having an acid value of 50-300 mg KOH/g, 1-70% OH- and epoxy group-containing polymer having an epoxy equivalent of 200-1000, OH equivalent of 250 to 1500, 1-45% alkoxy group-containing silicon polymer having an alkoxy equivalent 50-1500 and epoxy equivalent 100-1500, 1-70% polyester having OH value ≤300 mg KOH/g, acid value 20-400 mg KOH/g, and mol. weight 400-6000, and optionally, 1-40% aminoplast curing agent. A typical 51.1% solids composition contained 25.7:109:325:240:300 acrylic acid-2-ethylhexyl methacrylateiso-Bu acrylate-maleic anhydride-styrene copolymer Me ester solution 23.4, 77% 340:229:231:200 cyclohexyl methacrylate-glycidyl methacrylate-4-hydroxybutyl acrylate-Veova 9 copolymer solution 46.6, (SiMeR1O) 5 (SiMeR2R3O1/2) 4 (SiMeO3/2) 2 (R1 and R2 = MeO/BuO = 1/1, R3 = MeO/ γ glycidyloxypropyl = 1/1) 10, 75% 183:110:290:285:221 azelaic acid-Cardura E-neopentyl glycolisophthalic acid-trimethylolpropane copolymer solution 20, Bu4NBr 1, butyltin trioctoate 1, tri-Et orthoformate 1,5, flow-control agent 0.2, UV absorber 2, and light stabilizer 1 part. 172682-46-1, KC 89S IT

(high-solids curable resin compns. with good storage stability for abrasion- and acid- and water-resistant top layers in 2-coat 1-bake systems)

RN 172682-46-1 HCAPLUS

CN Poly[oxy(methoxymethylsilylene)], α -(dimethoxymethylsilyl)- ω -[(dimethoxymethylsilyl)oxy]- (9CI) (CA INDEX NAME)

No metal salt No mention
here of
use as
solid electrolyte

```
electrophotographic toner.
USE - Charge transporting elements and solid electrolytes are provided.
ADVANTAGE - The elements provide good resistance to abrasion and useful charge transport properties.
CMC UPB
           19990416
         *02* B414 B514 B614 B713 B720 B731 B732 B742 B743
     м3
              B744 B751 B752 B760 B770 B793 B798 B799
              B832 C017 C035 C053 F012 F019 F100 F199 G010 G011 G012
              G013 G019 G020 G021 G029 G040 G100 G111 G221 G299 H1
              H141 H142 H181 H402 H404 H405 H482 H484 H5 H541 H542 H581 H8
              J471 J472 L660 L699 M210 M211 M212 M213 M214 M215 M216 M231 M232
              M233 M262 M272 M273 M280 M281 M282 M283 M311 M312 M313 M314 M315
              M316 M321 M322 M323 M331 M332 M333 M334 M340 M342 M343 M344 M349
              M351 M361 M373 M381 M383 M391 M392 M393 M411 M510 M520
              M521 M522 M523 M530 M531 M532 M540 M620 M781 M903 M904
              Q348 Q349 R043
              RIN: 00012
              DCN: 9819-E1602-U
                                     Lithium Salt

with Jaclam 1 structure

(at least Jaclam)

(at least Jaclam)

Example 1;

See, e.g.,

See,
```

L133 ANSWER 15 OF 19 WPIX COPYRIGHT THE THOMSON CORP on STN WPIX Full-text

DNC C1998-068592

Electrophotographic charge generating element - comprises

SINICROPI, J A; SORRIERO, L J; WEISS, D S; ZUMBULYADIS, N

A 19980324 (199819)*

electroconductive layer, photoconductor charge generating layer and layer

18

the complex having a ratio of carbon atoms to silicon atoms of greater than 1.1 to 1.

charge generation element as above and a deposited image of positively charging

An electrophotographic charge generating element comprises: (a) an electroconductive layer; (b) a photoconductor charge generating layer overlying the electroconductive layer; and (c) a layer of glassy solid electrolyte overlying the electroconductive layer, the glassy solid electrolyte comprising: a silsesquioxane-salt complex having a surface resistivity of 1 multiply 1010 to 1 multiply 1016 ohms/square, the complex having a T2- silicone:T3-silicon ratio of less than 1:1,

Also claimed is a developed electrophotographic element comprising the electrophotographic

G03G005-147

19960620

COWDERY-CORVAN, J R; FERRAR, W T; MISKINIS, E T; NEWELL, C; RIMAI, D S;

19951106; US 1996-667270

1998-216483 [19]

1999-179924 [15]

of glassy solid electrolyte.

5731117 A UPAB: 19990416

(EAST) EASTMAN KODAK CO

DNN N1998-171175

US 5731117

PRAI US 1995-7252P

AN

CR

IN

PA

PΙ

$$V(x,t) = V_o - \frac{1}{2} \Delta V_o \left[erf \left(\frac{a+x}{\sqrt{\frac{4t}{R_{op}C}}} \right) + erf \left(\frac{a-x}{\sqrt{\frac{4t}{R_{op}C}}} \right) \right]$$
(1)

EXAMPLE 1

Synthesis of methyl acrylate/methylmethacrylate/ methacrylic acid (MaMmE) 70/25/5 wt % latex primer

To a 2 liter three-neck round bottom flask fitted with a 10 mechanical stirrer, condenser and a nitrogen inlet was added 400 mL of deionized water, 20 mL of a 10 % wt/vol solution of sodium dodecylsulfate, 1.0 gram of sodium persulfate and 0.5 grams of sodium bisulfite while the reaction flask was stirred in a 72° C. water bath. An addition funnel containing 15 70 grams of methyl acrylate, 25 grams of methyl methacrylate and 5 grams of methacrylic acid was placed on the stirred flask and the monomers were added over a 2 hour period. The aqueous phase and the organic phase were purged previous to the monomer addition with nitrogen. The 20 reaction mixture was initially a pale blue color and then became a translucent whitish-blue color. The reaction was allowed to stir overnight, the addition funnel was removed to vent unreacted monomers under a positive nitrogen flow for 50 minutes, and the reaction flask was removed from the 25 water bath and cooled with tap water. The reaction mixture was purified by dialysis against water for 3 days. The polymer had a T₂ of 35° C. (midpoint), a number average molecular weight of 22,600, and a weight average molecular weight 177,000. The resulting solution was then diluted to 2 30 wt % solids and 0.1 wt % of Triton-100™ surfactant (added as a 10 % wt/vol water solution) was added as a coating aid to provide a "priming solution".

Preparation of 80 wt % propylsilane /20 wt. % glycidoxysilane sol-gel

A sol-gel formulation was prepared as follows. Glacial acetic acid (108.0 grams, 1.80 mol) was added dropwise to a previously prepared, stirred mixture of propyltrimethoxgrams, 2.97 mol) and ysilane (489.6 3-glycidoxypropyltrimethoxysilane (122.4 grams, 0.518 40 mol), followed by the dropwise addition of 3-aminopropyltrimethoxysilane (49.6 grams, 0.277 mol). The acidified silanes were then hydrolyzed by the dropwise addition of excess water (312.0 grams, 17.3 mol). The following day, the clear solution was diluted to approxi- 45 mately 20 wt % solids by the dropwise addition of ethanol (1046 grams) and allowed to stir in a covered vessel for 1 week. DC-190 (16 grams) was subsequently added as a plasticizer, followed by the addition of lithium iodide (9.43 grams, 0.0704 mol) to provide a "sol-gel solution". Preparation of electrophotographic element.

The above described priming solution was coated onto the upper surface of the image loop (electrophotographic element) of a Kodak 1575 Copier-Duplicator marketed by Eastman Kodak Company of Rochester, N.Y. The image sloop had a support of poly(ethylene terephthalate). Overlaying the support was an nickel layer, a charge transport layer, and a charge generation layer.

The image loop was overcoated in the form of a continuous web; that is, prior to being cut to size and spliced into a loop. The priming solution was coated onto the charge generation layer (CGL) using a web coating machine operated at a web speed of 20 ft/min and dryer temperature of 80° F. The resulting coated web, having a primer layer about 0.1-0.5 micrometers thick, was wound on a spool. This web was then coated with the above sol-gel solution at a web speed of 10 ft/min and heating to 200° F., with ramped

heating and cooling, and wound on a spool. The web was subsequently cured face down at 180° F. for 24 hours. The cured film was evaluated as follows. Results are presented in Tables 6-8. One piece of overcoated film was evaluated in a Kodak 1575 copier.

Brittleness evaluation

Brittleness was tested by testing samples of the electrophotographic element in accordance with American National Standards Institute Test Standard PH 1.31 Brittleness of Photographic Film, Method B. "WEDGE BRITTLE-NESS TEST". The following is a description of the procedure.

All samples were tested at about 70° C. and 15 percent relative humidity. The sample size was 15 mm ×305 mm. The wedge angle was 9°. The wedge Length was 6 inches. The large wedge opening was 1 inch. The small wedge opening was 0.06 inch.

Samples were cut using a 15 mm Thwing-Albert parallel blade cutter. The samples were allowed to condition for at least 24 hours in the specified environment. The wedge was equipped with a clamp mechanism to hold one end of the loop stationary as the other end is pulled (snapped) through the wedge. The samples were placed in the wedge with the side of interest toward the outside when forming a loop. A reference mark was put on the sample at the wedge opening. This mark was considered the "zero" point for the data collection. The sample was then pulled through the wedge as fast as physically possible using a snap motion with the arm. This process was repeated for a total of 6 samples for each example.

Inspection of the samples required piped transmitted light and or surface reflected light to verify the crack location. The two techniques allow for quick observation with the transmitted light but the reflected light is used to verify samples in question. This results because the image belt has two coatings that respond to the test. Both layer's brittle behavior is observed with transmitted light while only the top surface characteristics can be observed in the reflected mode, allowing separation of the two layers when necessary.

The samples were read using the reference mark placed on the sample previous to testing and locating the crack farthest from that reference mark. The farthest crack is the first crack to occur and represents the largest diameter in the loop at failure. The scale accompanying the wedge provides the diameter of the loop at first failure and has units of inches. The larger the number, the more brittle is the specimen. Six specimens were tested and results were averaged and the standard deviation was determined. Results state the diameter of the loop, in inches, at which the first crack was observed.

50 Solid State Silicon-29 Nuclear Magnetic Resonance.

The extent of cure of the overcoat was measured by determining the silicon-29 solid state NMR spectra. Resonances were observed in the cross-polarized spectra at -60 PPM, corresponding to T² silicon atoms, and at -70 PPM. corresponding to T³ silicon atoms. Results are presented as the ratio of T²-silicon atoms to T³ silicon atoms (designated T²/T³).

Electrical properties under low intensity continuous excita-

One measure of an overcoat's ability to carry charge is to compare film voltage vs. exposure sensitometry using continuous exposure to low intensity light (also referred to as "low intensity continuous exposure" or "LICE"). The overcoated electrophotographic element was evaluated by measuring the exposure necessary at 2 ergs/cm²sec and a wavelength of 680 nm (approximately the maximum spectral sensitivity of the charge generation layer) to discharge the

TABLE 12

Ex.	V _{zaro} (50% RH)	V (50% RH)	ΔV _{erase} (50% RH)	V _{maro} (30% RH)	V ₂₂₃₆ (30% RH)	ΔV
Ex. 27	625	295	145	560	450	225
Ex. 28	540	170	120	_	-	_
Ex. 29	_		_	_	_	_
Ex. 30	545	200	140	_		
Ex. 31	535	145	95			

TABLE 13

				_
Ex.	Speed (100 V) (erg/cm²)	V _{toe} (LECE)	Overcost thickness (microns)	1:
Ex. 27	9.15	33 Volts	5	
Ex. 28	_	_	5	
Ex. 29	_	_	5	
Ex. 30	_	_	2	2
Ex. 31	_	_	J	_

TABLE 14

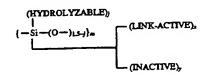
-Therestone ofter	- 2
	_
+120	
+30	
-50	3
⊸80	•
+130	
+45	_
	+30 -50

While specific embodiments of the invention have been shown and described herein for purposes of illustration, the protection afforded by any patent which may issue upon this application is not strictly limited to a disclosed embodiment; but rather extends to all modifications and arrangements which fall fairly within the scope of the claims which are appended hereto:

What is claimed is:

- 1. An electrophotographic charge generating element comprising:
 - (a) an electrically conductive layer;
 - (b) a photo conductor charge generating layer overlying said electrically conductive layer; and
 - (c) a layer of glassy solid electrolyte overlying said electrically conductive layer, said glassy solid electrolyte comprising: a silsesquioxane-salt complex having a surface resistivity from about 1×10¹⁰ to about 1×10¹⁶ ohms/sq, said complex having a T²-silicon ratio of less than 1:1, said complex having a ratio of carbon atoms to silicon atoms of greater than 1:1 to 1. 55
- 2. The electrophotographic charge generating element of claim 1 wherein said complex has a ratio of carbon atoms to silicon atoms of greater than about 2:1.
- 3. The electrophotographic charge generating element of claim 2 wherein said complex has a a T²-silicon T³-silicon contains of from about 0.5:1 to about 0.3:1.
- 4. The electrophotographic charge generating element of claim 1 wherein said complex has a T²-silicon/T³-silicon ratio of less than 0.1:1.
- 5. The electrophotographic charge generating element of 63 claim 1 wherein said complex has a ratio of carbon atoms to silicon atoms of greater than 1.2 to 1.

6. The electrophotographic charge generating element of claim 1 wherein said silsesquioxane consists essentially of a compound represented by the general formula:



wherein

10

0≦j<0.5;

m is greater than 10;

x+y is about 1;

x/(x+y) is less than about 0.40;

HYDROLYZABLE is selected from the group consisting of: OH; H; I; Br; Cl; alkoxy having from 1 to about 6 carbons; —O—Ar, wherein Ar is phenyl or aminophenyl; -(O-ALKYLENE), O-ALKYL; wherein ALKYLENE is an alkylene group having from 2 to about 6 carbons, n is an integer from 1 to about 3, and ALKYL is an alkyl group having from 1 to about 6 carbons; primary and secondary amino having from one to about 6 carbon atoms; -N-(ALKYL)₂.

wherein each ALKYL is alkyl having from 1 to about 6 carbons; —NH-(ALKYL).

wherein ALKYL is alkyl having from 1 to about 6 carbons; and —O—CO-ALKYL.

wherein ALKYL is an alkyl having from 1 to 6 carbons; LINK is divalent and is selected from the group consisting of: alkyl having from 1 to about 12 carbons, fluoroalkyl having from 1 to about 12 carbons, cycloalkyl having a single, 5 or 6 membered ring, and aryl having a single, 5 or 6 membered ring;

ACTIVE is monovalent organic moiety having an O. S. or N complexed with a charge carrier, and having a total of carbons and heteroatoms of from about 4 to about 14:

INACTIVE is monovalent and is selected from the group consisting of: alkyl having from 2 to about 12 carbons, fluoroalkyl having from 2 to about 12 carbons, cycloalkyl having a single, 5 or 6 membered ring, and aryl having a single, 5 or 6 membered ring.

7. The electrophotographic charge generating element of claim 6 wherein substantially all HYDROLYZABLE moi-

8. The electrophotographic charge generating element of claim 6 wherein ACTIVE includes an oxy, thio, ester, keto, imino, or amino group.

9. The electrophotographic charge generating element of claim 6 wherein ACTIVE is selected from the group consisting of glycidoxy ethers; epoxides; pyrolidinones; amino alcohols; amines; ammonium salts. carboxylic acids; conjugate salts of carboxylic acids; sulfonic acids; conjugate salts of sulfonic acids; and neutral rings and chains of ethylene oxides, propylene oxides, tetramethylene oxides, ethylene imines, and alkylene sulfides; and the total number of carbons in -LINK-ACTIVE is from 4 to about 25 and combinations thereof.

10. The electrophotographic charge generating element of claim 6 wherein said charge carrier is a low lattice energy salt or a neutral species capable of forming an ionic or substantially ionic charge transfer complex with said silsesquioxane.

11. The electrophotographic charge generating element of claim 6 wherein said charge carrier is selected from the

group consisting of I₂, LiCl. LiCOOCH₃, LiNO₃, LiNO₂. LiBr, LiN₃, LiBH₄, LiI, LiSCN, LiClO₄, LiCF₃SO₃, LiBF₄. LiBPh₄, NaBr, NaN₃, NaBH₄, NaI, NaSCN, NaClO₄, NaCF₃SO₃, NaBF₄, NaBPh₄, KSCN, KClO₄, KCF₃SO₃, KBF₄, KBPh₄, RbSCN, RbClO₄, RbCF₃SO₃, RbBF₄, RbBPh₄, CsSCN, CsClO₄, CsCF₃SO₃, CsBF₄, CsBPh₄, quaternary ammonium salts, ammonium hydroxide, and ammonium halides; and combinations thereof.

12. The electrophotographic charge generating element of claim 6 further comprising colloidal basic hydrophilic silica covalently bonded to said silsesquioxane.

13. The electrophotographic charge generating element of claim 6 further characterized as a flexible electrophotographic element.

14. The electrophotographic element of claim 13 wherein said silsesquioxane has the general formula:

wherein

0≦j<0.5;

m is greater than 10;

hydrolyzable is selected from the group consisting of: OH; H; I; Br; Cl; alkoxy having from 1 to about 6 carbons; —O—Ar, wherein Ar is phenyl or aminophenyl; (O-ALKYLENE),—O-ALKYL; wherein ALKY- 35 LENE is an alkylene group having from 2 to about 6 carbons, n is an integer from 1 to about 3, and ALKYL is an alkyl group having from 1 to about 6 carbons; primary and secondary amino having from one to about 6 carbon atoms; —N-(ALKYL), wherein each ALKYL is alkyl having from 1 to about 6 carbons; and —NH-(ALKYL), wherein ALKYL is alkyl having from 1 to about 6 carbons; and —O—CO-ALKYL, wherein ALKYL is an alkyl having from 1 to 6 carbons; 45

a is from 1 to about 5.

b is is from 1 to about 5.

c is from 1 to about 6.

x' is from about 5 to about 45 mol %.

x" is from about 1 to about 45 mol %.

x'+x'' is from about 5 to 45.

y' is from about 0 to about 95 mol %.

y" is from about 0 to about 95 mol %,

and y'+4" is from about 95 to about 55 mol %.

15. The electrophotographic element of claim 13 wherein said silsesquioxane has the general formula:

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$$\{ (CH_2)_3 - O - R \}_{s}$$

$$\{ -Si - (O -)_{1.5-j} \}_{s}$$

$$= \{ (CH_2)_3 - O - R \}_{s}$$

$$- \{ (CH_2)_3 - O - R \}_{s}$$

$$- \{ (CH_2)_3 - CH_3 \}_{s}$$

$$- \{ (CH_3)_2 - CH_3 \}_{s}$$

wherein

0≦j<0.5;

m is greater than 10;

R is

15

20

25

x' is from about 5 to about 30 mol %;

x" is from about 2 to about 10 mol %;

y' is from about 40 to about 90 mol %; and

y" is from about 0 to about 55 mol %.

16. The electrophotographic element of claim 15 wherein 0.3≦j<0.5.

17. The electrophotographic element of claim 13 wherein said silsesquioxane has the general formula:

$$\{-Si-(O)_{1,2-j}\}_{m} = \{(CH_{2})_{2}-O-R\}_{s'} - \{(CH_{2})_{3}-NH_{2}\}_{s'} - \{(CH_{3})_{3}-NH_{2}\}_{s'} - \{(CH_{3})_{3}-NH_{3}\}_{s'} - \{(CH_{3})_{3}-NH_{3}\}_$$

wherein

0≦j<0.5;

m is greater than 10;

R is

50

x' is from about 5 to about 30 mol %;

x" is from about 2 to about 10 mol %; and

y" is from about 60 to about 90 mol %.

18. The electrophotographic element of claim 16 wherein

65 0.2≤j<0.5.</p>
19. The electrophotographic element of claim 13 wherein said silsesquioxane has the general formula:

33

(OH) ·si-(0)[--]}= {(CH2)3-NH2}2 {CH₃}

wherein

0≦j<0.3;

m is greater than 10;

x" is from about 10 to about 40 mol %; and

y" is from about 0 to about 90 mol %.

0.1≦j<0.3.

21. The electrophotographic element of claim 13 wherein said solid electrolyte further comprises a plasticizer.

22. The electrophotographic element of claim 21 wherein said plasticizer is a polysiloxane polyether copolymer.

23. The electrophotographic element of claim 13 wherein said solid electrolyte further comprises an alcohol soluble surfactant.

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24. The electrophotographic element of claim 13 wherein said solid electrolyte further comprises poly

(dimethylsiloxane).

25. The electrophotographic element of claim 13 further 5 comprising primer bonded between said charge generating layer and said layer of glassy solid electrolyte. said primer being selected from the group consisting of acrylics. polyurethanes, pyrrolidones, polyamides, polyesters, and inorganic alkoxides and combinations thereof.

26. The electrophotographic element of claim 25 wherein said primer is selected from the group consisting of the polymerization product of methacrylatemethylmethacrylate-methacrylic acid latex; copolymer of poly((95 parts by weight) vinylpyrrolidone-(5 parts by weight) methacrylic acid); iodine- or iodide-doped copoly-20. The electrophotographic element of claim 19 wherein 15 mer of poly((95 parts by weight) vinylpyrrolidone-(5 parts by weight) methacrylic acid); and partially hydrolyzed aminopropyltrimethoxysilane.

27. A developed electrophotographic element comprising the electrophotographic charge generation element of claim 20 1 and a deposited image of positively charging electropho-

tographic toner.

12/8/04, EAST Version: 2.0.1.4

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7/9/1
DIALOG(R) File 94: JICST-EPlus
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          JICST ACCESSION NUMBER: 98A0702616 FILE SEGMENT: JICST-E
Syntheses and Properties of Fluoroalkylated Oligomers Containing Oligo(oxyethylene) Units.
SAWADA H (1); ITOH M (1); LEE K (1); KYOMANE J (1); KAWASE T (2); HAYAKAWA
    Y (3); YOSHINO K (4); BABA M (5)
(1) Nara National Coll. Technol., Nara-ken; (2) Osaka City University, Osaka-shi
; (3) National Ind. Res. Inst. Nagoya, Nagoya-shi; (4)Osaka University, Osaka
; (5) Kagoshima University, Kagoshima-shi
Nippon Yuka Gakkaishi (Journal of Japan Oil Chemists' Society), 1998,
    VOL.47,NO.7, PAGE.685-694, FIG.3, TBL.3, REF.14
JOURNAL NUMBER: G0238ABW
                           ISSN NO: 1341-8327
                                                  CODEN: NIYUF
UNIVERSAL DECIMAL CLASSIFICATION: 661.185.6
                          COUNTRY OF PUBLICATION: Japan
LANGUAGE: English
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
            New fluoroalkylated end-capped co-oligomers containing oligo(oxyethylene) units were
ABSTRACT:
prepared by reactions of fluoroalkanoyl peroxides with oligo(oxyethylene) units -containing
vinylsilane(or methacrylates) and co-monomers such as acrylic acid, dimethylacrylamide and
isopropylacrylamide. By these fluorinated co-oligomers containing oligo(oxyethylene) units, the
surface tension of water could be reduced effectively with a clear break point resembling CMC and
```

appeared to be formed intra- or inter molecular aggregates resembling micelles in water. The cooligomers containing oligo(oxyethylene) units were found useful for extracting various metal cations and oligomer **electrolyte** film containing LiCF3SO3 showed high ionic conductivity of 4*10-5S/cm at room temperature. Of particular interest is the finding that the fluoroalkylated endcapped acrylic acid co-oligomers containing oligo(oxyethylene) units were found to strongly and

DESCRIPTORS: polyether; fluorine-containing polymer; oligomer; copolymer; silanes; vinyl compound; ether; trimer; polymeric surfactant; polyelectrolyte; ionic conduction; antiviral action; HIV(virus); HIV1; aliphatic carboxylic acid; unsaturated carboxylic acid; carboxamide; aliphatic alcohol

selectively inhibit HIV-1 replication in vitro. (author abst.)

BROADER DESCRIPTORS: polymer; halogen-containing polymer; silicon compound; carbon group element compound; olefin compound; multimer; surfactant; polymeric agent; functional polymer; macromolecule; electrolyte; matter; electric conduction; electrical property; antimicrobial action; pharmacological action; action and effect; Lentivirus; Retroviridae; RNA virus; virus; microorganism; animal virus; carboxylic acid; alcohol; hydroxy compound

L64 ANSWER 8 OF 18 HCAPLUS COPYRIGHT ACS on STN

AN 1995:268 DN 122:13730 ED Entered STN: 08 Nov 1994

TI Hardenable solid electrolyte compositions and solid polymer electrolytes

IN Yokoyama, Masao; Noda, Koji

PA Kanegafuchi Chemical Ind, Japan

DATE PATENT NO. KIND APPLICATION NO. DATE -------------------_____ 19911007 JP 05098169 **A2** 19930420 JP 1991-259473 PI 20000731

JP 3071262 B2 20000731 PRAI JP 1991-259473 19911007

AB The compns. comprise a compound containing ≥1 alkenyl group(s), a compound containing ≥2 hydrosilyl groups, a catalyst for hydrosilylation, and an alkali metal salt. Polymer electrolyte sheets prepared from these compns. are chemical stable, have high flexibility, and are useful for batteries and capacitors, etc.

IT Siloxanes and Silicones, uses (solid electrolytes containing lithium salts and, manufacture of, for batteries and capacitors)

IT 16941-12-1

(catalyst, in preparation of solid siloxane electrolytes for batteries and capacitors)

RN 16941-12-1 HCAPLUS

CN Platinate(2-), hexachloro-, dihydrogen, (OC-6-11)- (9CI) (CA INDEX NAME)

●2 H⁺

RN 147051-70-5 HCAPLUS

CN Cyclotetrasiloxane, 2,2'-(1,10-decanediyl)bis[2,4,6,8-tetramethyl- (9CI)

no mention of ? baking?

RN 151597-84-1 HCAPLUS

CN Cyclotetrasiloxane, 2,4,6,8-tetramethyl-2,6-bis[10-(2,4,6,8-tetramethylcyclotetrasiloxan-2-yl)decyl]- (9CI) (CA INDEX NAME)

PAGE 1-A

PAGE 1-B

7791-03-9P 33454-82-9P

(solid electrolytes containing siloxanes and, manufacture of, for batteries and capacitors)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

IT

● L:

RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)

L69 ANSWER 25 OF 36 HCAPLUS COPYRIGHT ACS on STN

AN 1993:639338 HCAPLUS Full-text

DN 119:239338

ED Entered STN: 27 Nov 1993

TI Crosslinked polyethylene glycol and its derivatives as fast ion conductors

IN Lisisimide, John; Du, Xia

PA Chengdu University of Science and Technology, Peop. Rep. China

PATENT NO. KIND DATE APPLICATION NO. DATE

PI CN 1063112 A 19920729 CN 1991-107117 19910112

PRAI CN 1991-107117 19910112

AB Crosslinked polyethylene glycol and its derivs. are fast ion conductors and are prepared by heating a composition comprising polyethylene glycol or its derivative (mol. weight 200-10,000) 50-95, a crosslinking agent (i.e., an isocyanate or an epoxide) 1-50, an auxiliary crosslinking agent (i.e., a glycidic ether or cyanuric acid) 0-30, an alkaline metal salt (i.e., LiClO4, LiCF3SO3, or KCF3SO3) 5-60, a additive (i.e., propylene carbonate or DMF) 10-150, and a Pt catalyst 0-10 parts at 65-85° for 24 h in a N atmospheric. The fast ion conductors can be made into thin films (100µ) for use in high-energy-d. rechargeable batteries.

IT 60665-85-2 124219-73-4

(polyethylene glycol and its derivs. crosslinked by, as fast ion conductors)

RN 60665-85-2 HCAPLUS

CN Cyclotetrasiloxane, 2,4,6,8-tetramethyl-2,4,6,8-tetrakis[3-(oxiranylmethoxy)propyl]- (9CI) (CA INDEX NAME)

PAGE 1-A

PAGE 2-A

Ьн₂

RN 124219-73-4 HCAPLUS

CN Cyclotetrasiloxane, 2,4,6,8-tetrakis[2-[3-(1-isocyanato-1-methylethyl)phenýl]propyl]-2,4,6,8-tetramethyl- (9CI) (CA INDEX NAME)

PAGE 1-A

Claim 1 Structure

PAGE 2-A

Page 1 of 2

L64 ANSWER 11 OF 18 HCAPLUS COPYRIGHT ACS on STN

1994:21431 DN 120:21431 ED Entered STN: 08 Jan 1994 AN

Lithium ion-conductive polymer electrolyte

IN Akashiro, Kiyoaki; Nagai, Tatsu; Kawakami, Akira

Hitachi Maxell K. K., Japan

PATENT NO. KIND DATE APPLICATION NO. DATE ------------------------

JP 04056002 **A2** 19920224 JP 1990-162153 19900620 PΙ

PRAI JP 1990-162153 19900620

The electrolyte is a Li salt complex with a crosslinked poly(ethylene glycol) (average mol. weight <SYM179>1000)-poly(ethylene glycol) monomethyl ether-(average mol. weight <SYM163>1000)hydroxy-terminated siloxane. The complex has good ion conductivity

Siloxanes and Silicones, compounds (polyoxyalkylene-, graft, polymer electrolytes containing lithium salts and, for batteries)

IT RL: TEM (Technical or engineered material use); USES (Uses) (solid electrolyte, for batteries)

RN 7439-93-2 HCAPLUS

Lithium (7CI, 8CI, 9CI) (CA INDEX NAME) CN

151755-32-7 HCAPLUS RN

CN 1,2-Ethanediol, polymer with 2-methoxyethanol and 2,4,6,8tetramethylcyclotetrasiloxane (9CI) (CA INDEX NAME)

CM 1 CRN 2370-88-9 CMF C4 H16 O4 Si4

Claim 1 structure

CM 2

CRN 109-86-4 CMF C3 H8 O2

HO_CH2_CH2_O_CH3

CM 3 CRN 107-21-1 CMF C2 H6 O2

HO_CH2_CH2_OH

DWPI record says: then

aropped on en Al plate, 100 deg c

made to react at 100 deg c

made to react at

for 3 hrs. See attached record

DERWENT-ACC-NO:

1992-111215

DERWENT-WEEK:

199214

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TITLE:

Lithium ion conductive polymer electrolyte used in battery - comprising composite of lithium salt and

siloxane! hydride graft-copolymerised with

polyether:glycol!

PATENT-ASSIGNEE: HITACHI MAXELL KK(HITM)

PRIORITY-DATA: 1990JP-0162153 (June 20, 1990)

N/A

PATENT-FAMILY:

PUB-NO

PUB-DATE

LANGUAGE

PAGES

MAIN-IPC

JP 04056002 A

February 24, 1992

N/A

009

N/A

APPLICATION-DATA:

JP 04056002A

APPL-DESCRIPTOR

APPL-NO 1990JP-0162153 APPL-DATE

June 20, 1990

INT-CL (IPC): C08G081/00, H01B001/06, H01M006/18

ABSTRACTED-PUB-NO: JP 04056002A

BASIC-ABSTRACT:

The lithium ion conductive polymer electrolyte comprises a composite material of lithium salt and organic polymer. The organic polymer comprises a crosslinked polymer of the graft cpd. of siloxane hydride which is graft-copolymerised with polyetherglycol of at least 1,000 in average molecular wt. and polyetherglycolmonomethylether of up to 1,000 in average molecular wt.

USE/ADVANTAGE - The lithium ion conductive polymer electrolyte is used for the lithium battery. Electrolyte having improved ion conductivity which is in solid state at room temp., can be obtd.

In an example 1g of tetramethylcyclo tetrasiloxane, 10g of allylated polyethyleneglycol of 1,000 in average molecular wt., 2g of allylated polyethyleneglycol monomethylether of 200 in average molecular wt., and 2mg of potassium chloroplatinate were mixed and made to react at 100 deg.C for 3 hrs. with stirring to obtain graft cpd.

52g of the graft cpd. were mixed with 0.168g of hexamethylene-diisocyanate and catalyst for making urethane. The mixt. was dropped on an Al plate, then made to react at 100 deg.C for 3 hrs. on the hot-plate in Ar gas to obtain crosslinked polymer. The obtd. polymer was soaked in acetone to remove unreacted matter. Then, the polymer was soaked in acetone soln. of 2 wt.% LiBF4 for 8 hrs. to impregnate the LiBF4 acetone soln. into the polymer. Then, acetone was removed from the polymer to prepare the polymer electrolyte sheet of 0.1 mm in thickness.

CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: LITHIUM ION CONDUCTING POLYMER ELECTROLYTIC BATTERY COMPRISE

COMPOSITE LITHIUM SALT POLYSILOXANE HYDRIDE GRAFT COPOLYMERISE

POLYETHER POLYGLYCOL

DERWENT-CLASS: A25 A85 L03 X12 X16

CPI-CODES: A05-H03; A06-A00E2; A12-E06; L03-E01C;

EPI-CODES: X12-D01C; X16-A02A; X16-J02; X16-J08;

POLYMER-MULTIPUNCH-CODES-AND-KEY-SERIALS:

Key Serials: 0004 0005 0013 0037 0041 0046 0130 0202 0231 1279 1297 1301 1304 1306 1760 1948 2001 2002 2014 2020 2021 2022 2049 2064 2148 2149 2152 2155 2197 2198 2202 2207 2382 2432 2441 2522 2551 2585 2654 2709 2739 Multipunch Codes: 014 028 035 038 04- 05- 06- 07- 075 09& 10& 147 15& 150 19& 207 209 225 229 230 231 24- 240 250 262 278 279 282 31- 334 344 346 35- 357 359 2 of 2

L69 ANSWER 28 OF 36 HCAPLUS COPYRIGHT ACS on STN

AN 1992:84807 DN 116:84807 ED Entered STN: 06 Mar 1992

TI Solid polymer electrolytes of lithium salts

and polyethylene glycols crosslinked with a siloxane-based tetraisocyanate

AU Xia, Du Wei; Zhou, Guangbin; Smid, Johannes

CS Coll. Environ. Sci. For., State Univ. New York, Syracuse, NY, 13210, USA

SO Integr. Fundam. Polym. Sci. Technol. -- 5, [Proc. Int. Meet. Polym. Sci. Technol., Rolduc Polym.

Meet.--5], 5th (1991), Meeting Date 1990, 395-9. Editor(s): Lemstra, P. J.; Kleintjens, L. A.

Publisher: 44-50, London, UK. CODEN: 57HAAD

DT Conference

LA English

AB Solvent-free electrolyte complexes with elec. conductivity (σ) approaching 10-3 S/cm at 90° were formed when LiClO4 or LiCF3SO3 are solubilized in networks of polyoxyethylenes and an aliphatic tetraisocyanate made from α , α -di-Me m-isopropenylbenzyl isocyanate and cyclotetrasiloxane. The value of σ increased to close to 10-2 S/cm on adding 30 wt% propylene carbonate, while the room-temperature σ reached 2 x 10-3 S/cm.

TT 7791-03-9DP, Lithium perchlorate, complexes with isocyanate-containing siloxane-crosslinked polyoxyethylenes 33454-82-9DP, Lithium triflate, complexes with isocyanate-containing siloxane-crosslinked polyoxyethylenes 138855-09-1DP, lithium complexes

(networks, solid electrolytes from, preparation and conductivity of)

RN 138855-09-1 HCAPLUS

CN Cyclotetrasiloxane, 2,4,6,8-tetrakis[2-[3-(1-isocyanato-1-methylethyl)phenyl]propyl]-2,4,6,8-tetramethyl-, polymer with α -hydro- ω -hydroxypoly(oxy-1,2-ethanediyl)

CM 1

CRN 124219-73-4

CMF C56 H76 N4 O8 Si4

PAGE 1-A

PAGE 2-A

CM 2 CRN 25322-68-3 CMF (C2 H4 O)n H2 O CCI PMS

baked?

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L69 ANSWER 29 OF 36 HCAPLUS COPYRIGHT ACS on STN
AN
     1991:45172 HCAPLUS Full-text
DN
     114:45172
ED
     Entered STN: 09 Feb 1991
     Anticorrosive fluorescent coatings with good electrical conductivity and
ΤI
     antimicrobial properties
     Yamamoto, Tatsuo; Uchida, Shinji; Kurihara, Yasuo; Sugiura, Koji
IN
     Shinagawa Fuel Co., Ltd., Japan; Shinanen New Ceramic K. K.
PA
     PATENT NO.
                        KIND
                               DATE
                                           APPLICATION NO.
                                                                  DATE
                                           -----
                                                                  _____
     JP 02251585
                         A2
                               19901009
                                           JP 1989-72819
                                                                  19890324
PRAI JP 1989-72819
                               19890324
     The title coatings contain R'4-nM(OR2)n (I; M=metal; R1, R2=C1-5 hydrocarbyl; n=1-4) and
     0.1-30% (based on 100 parts I) aluminosilicate hydrates. Thus, a composition of 100:5
     MeSi(OMe)3-Ag aluminosilicate (from Zeolite A; containing 25% H2O) was spread on a glass plate
     and baked at 40° for 20 min to give a film showing good anticorrosion, antimicrobial ability,
     resistivity 5 + 10-4 \Omega-cm, and relative strength of fluorescence (517 nm) 52 (based on
     anthracene at 420 nm as 1).
    Electric conductors
IT
        (coatings, metal alkoxide-aluminosilicate hydrate-containing,
        antimicrobial, anticorrosive, fluorescent substances as)
     1185-55-3, Methyltrimethoxysilane
IT
        (coatings containing aluminosilicate hydrates and, anticorrosive
        antimicrobial, elec. conductive, fluorescent substance as)
RN
     1185-55-3 HCAPLUS
     Silane, trimethoxymethyl- (6CI, 8CI, 9CI) (CA INDEX NAME)
CN
      OMe
 MeO_Si_Me
                 a \text{ or } c \text{ or } d = 1
      Оме
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L64 ANSWER 13 OF 18 HCAPLUS COPYRIGHT ACS on STN

AN 1989:410308 DN 111:10308

ED Entered STN: 08 Jul 1989

TI Solid-state lithium batteries

IN Kanamori, Yoshinori; Takehara, Zenichiro; Kokumi, Zenhachi

PA Japan Storage Battery Co., Ltd., Japan

PATENT NO. KIND DATE APPLICATION NO. DATE

JP 01054673 A2 19890302 JP 1987-209923 19870824

PRAI JP 1987-209923 19870824

AB Solid-state Li batteries have a thin layer of a solid organic electrolyte formed on a layer of an electrode-active mass by plasma polymerization. Thus, a siloxane layer of low glass-transition temperature was deposited on a layer of TiS2 with a Ti substrate by plasma polymerization using octamethylcyclotetrasiloxane as monomer. The siloxane layer was impregnated with LiClO4 and poly(propylene oxide) in a BuOH and dried to obtain a electrolyte-cathode composite with the electrolyte layer having an a.c. conductance 1+10-6 S/cm. A battery was obtained by vacuum deposition of Li on the electrolyte layer.

IT 7791-03-9, Lithium perchlorate

(electrolytes from plasma-polymerized organic layer and, solid, for lithium batteries)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt

PI

Dried but not baked?

Li

IT 25037-57-4 121115-61-5

(plasma-polymerized, electrolyte layers containing, for solid-state lithium batteries)

RN 25037-57-4 HCAPLUS

CN Cyclotetrasiloxane, octamethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1 CRN 556-67-2 CMF C8 H24 O4 Si4

RN 121115-61-5 HCAPLUS

CN Methanesulfonic acid, trifluoro-, polymer with chlorotrifluoroethene (9CI)

CM 1 CRN 1493-13-6 CMF C H F3 O3 S

CM 2 CRN 79-38-9 CMF C2 C1 F3

CF2 Cl_C_F

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ANSWER 2 OF 4 HCAPLUS COPYRIGHT ACS on STN
L92
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1985:133692 DN 102:133692 ED Entered STN: 20 Apr 1985 ΑN

Products from an inorganic material and a polyimide resin TΙ

Shin-Etsu Chemical Industry Co., Ltd., Japan PA

KIND DATE APPLICATION NO. ----------19830411 JP 1983-63393 JP 59188431 **A2** 19841025

19880812 JP 63040667 **B4** 19830411 PRAI JP 1983-63393

PATENT NO.

An inorg, substrate is coated with a polyamic acid resulting from the reaction of AB [H2N(CH2CH2NH)aZ]bRcSiO(4-b-c)/2 (Z = divalent organic group; R = monovalent organic group; a = 0, 1; 0 < b < 4; 0 \leq c < 4; 0 < (b + c) \leq 4), H2NZ1NH2 (Z1 = Si-free divalent organic group), and I (Q = tetravalent organic group) and then with a polyimide resin. Thus, a Si wafer with a SiO2 surface was coated with a solution of the copolymer [62891-63-8] of O[SiMe2(CH2)3NH2]2, 4,4'diaminodiphenylmethane, and 3,3',4,4'-benzophenonetetracarboxylic dianhydride in AcNMe2, dried at 150° for 1 h and at 200° for 30 min, coated with a solution (viscosity 1000 cP, 25°) of Pyre ML [25036-53-7] in N-methylpyrrolidone, and cured at 150° for 1 h and at 300° for 40 min to give a product with excellent moisture resistance.

95505-86-5 HCAPLUS RN

1,3-Isobenzofurandione, 5,5'-carbonylbis-, polymer with CN 3,3'-(1,1,3,3,5,5,7,7,9,9-decamethyl-1,9-pentasiloxanediyl)bis[1propanamine] and 4,4'-methylenebis[benzenamine] (9CI) (CA INDEX NAME)

CRN 89467-47-0 CMF C16 H46 N2 O4 Si5

CM CRN 2421-28-5 C17 H6 O7 CMF

CM 3 101-77-9 CMF C13 H14 N2

95505-87-6 HCAPLUS

CN

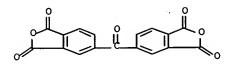
1,3-Isobenzofurandione, 5,5'-carbonylbis-, polymer with 4,4'-methylenebis[benzenamine] and 3,3'-(1,1,3,3-tetramethoxy-1,3disiloxanediyl)bis[1-propanamine] (9CI) (CA INDEX NAME)

CM 1 CRN 76712-65-7 CMF C10 H28 N2 O5 Si2 1062

DATE

OME OME H2N_ (CH2)3_ Si_O_ Si_ (CH2)3_NH2 OME OME

> CM 2 CRN 2421-28-5 CMF C17 H6 O7



CM 3 CRN 101-77-9 CMF C13 H14 N2

RN 95505-88-7 HCAPLUS

CN 1,3-Isobenzofurandione, 5,5'-carbonylbis-, polymer with 4,4'-methylenebis[benzenamine] and 4,4'-(1,1,3,3-tetramethyl-1,3-disiloxanediyl)bis[2-methylbenzenamine] (9CI) (CA INDEX NAME)

CM 1 CRN 78736-40-0 CMF C18 H28 N2 O Si2

CM 2 CRN 2421-28-5 CMF C17 H6 O7

CM 3 CRN 101-77-9 CMF C13 H14 N2

2 ° £ 2

L69 ANSWER 34 OF 36 HCAPLUS COPYRIGHT ACS on STN

AN 1982:70539 DN 96:70539 ED Entered STN: 12 May 1984

TI Epoxy resin composition modified with siloxanes

PA Toray Silicone Co., Ltd., Japan

	rotal stricence co.,	200.,	oupu		
	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	NL 8001906	A	19811102	NL 1980-1906	19800401
	NL 185673	В	19900116		
		_	4 0 0 0 0 0 4 0		

NL 185673 B 19900116
NL 185673 C 19900618
PRAI NL 1980-1906 A 19800401

Epoxy resins are modified with alkyl Ph siloxanes and Si compds. containing epoxy, methacryloyl, or amino groups, giving compns. with improved resistance to moisture and boiling water. Thus, Epon 1001 112.5, Me Ph siloxane (mol. weight 1600) 37.5, 2-ethylhexanoic acid 2, and EtO(CH2)2OAc 100 parts were slowly heated to 150-155° while water was removed by distillation, and heated 8 h at 150-155°. Siloxane-modified epoxy resin 100, trimellitic anhydride 12, and [N-(2-aminoethyl)-3- aminopropyl]trimethoxysilane (I) [1760-24-3] were coated as a EtO(CH2)2OAc solution to a 50- μ layer on a glass plate and baked 60 min at 150°, giving a clear coating with pencil hardness 2H, crosscut adhesion 100/100, good adhesion after 30 h in boiling water at normal pressure, and volume resistance 5.8 + 1016 and 1.1 + 1015 Ω .cm initially and after boiling water treatment. A control coating without I had values of clear, 2H, 100/100, spontaneous flaking after 1 h in boiling water, 6.3 + 1016 Ω .cm, and 1.7 + 1013 Ω .cm, resp.

IT Coating materials

(siloxane-modified epoxy resins, containing functional silanes, with improved boiling water resistance)

IT Electric insulators and Dielectrics

(coatings, siloxane-modified epoxy resins, containing functional silanes, with improved boiling water resistance)

IT 76712-65-7

RL: USES (Uses)

(siloxane-modified epoxy resin coatings containing, with improved boiling water resistance)

RN 76712-65-7 HCAPLUS

CN 1-Propanamine, 3,3'-(1,1,3,3-tetramethoxy-1,3-disiloxanediyl)bis- (9CI) (CA INDEX NAME)

no metal salt L64 ANSWER 16 OF 18 HCAPLUS COPYRIGHT ACS on STN

AN 1981:570499 DN 95:170499 ED Entered STN: 12 May 1984

TI Siloxane-modified epoxy resin compositions

IN Mikami, Ryuzo

PA Toray Silicone Co., PATENT NO.		Ltd., Japan KIND DATE		APPLICATION NO.	DATE	
ΡI	US 4287326	A	19810901	US 1980-126231	19800303	
	AU 529567	B2	19830609	AU 1980-56594	19800319	
	AU 8056594	A1	19810924			
	CA 1124937	A1	19820601	CA 1980-348280	19800324	
PRAI	US 1980-126231		19800303			

AB Moisture resistant epoxy resin compns. having resistance to degradation of elec. properties are obtained by modifying the resin with a polysiloxane and adding a conventional curing agent and an organosilane. Thus, siloxane-modified Epon 1001 100, trimellitic anhydride 12, and [N-(2-aminoethyl)-3-aminopropyl]trimethoxysilane (I) [1760-24-3] 6 parts were mixed, coated on plates, and baked 60 min at 150°. After 30 h in boiling water, the resulting film remained firmly adhered to the substrate, while films containing no I showed spontaneous peeling. Retention of volume resistivity was also improved by the presence of I.

IT Siloxanes and Silicones, uses and miscellaneous

(Me Ph, epoxy resins modified by, moisture-resistant)

IT 2530-83-8 76712-65-7

(siloxane-modified epoxy resin containing, moisture-resistant)

RN 2530-83-8 HCAPLUS

CN Silane, trimethoxy[3-(oxiranylmethoxy)propyl]- (9CI) (CA INDEX NAME)

RN 76712-65-7 HCAPLUS

CN 1-Propanamine, 3,3'-(1,1,3,3-tetramethoxy-1,3-disiloxanediyl)bis- (9CI) (CA INDEX NAME)

no metal salt

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10/733,265 searched 12/7/2004
L69 ANSWER 35 OF 36 HCAPLUS COPYRIGHT ACS on STN
    1967:482684 DN 67:82684 ED Entered STN: 12 May 1984
AN
    Polysiloxane block copolymers
TI
    Bostick, Edgar E.
TN
                                                                                     p 1 of 3
    General Electric Co.
PA
                                           APPLICATION NO.
                                                                  DATE
                               DATE
                        KIND
     PATENT NO.
                                                                  _____
                                                                  19660411
                               19670822
PI
     US 3337497
                                           DE
    DE 1720826
                                           FR
     FR 1526205
                                           GB
     GB 1182471
                CLASS PATENT FAMILY CLASSIFICATION CODES
 PATENT NO.
                       ______
                       260046500
 US 3337497
     Polysiloxane block copolymers containing blocks that are 75-100% pure are prepared by treating a
AB
     cyclic polysiloxane with an organolithium compound containing a LiO group bonded directly to an
     Si atom. Thus, 5 g. hexamethylcyclotrisiloxane was mixed with 2.2 ml. dry tetrahydrofuran and
     0.071 + 10-3 mole di-Li siloxanolate of meso-1,3-dimethyl-1,3- diphenyldisiloxane-1,3-diol, and
     the mixture was refluxed for 135 min., followed by the addition of 5 g. cis, trans-2,4,6-
     trimethyl-2,4,6- triphenylcyclotrisiloxane in 10 ml. C6H6 from a CaH2 suspension. The mixture
     was heated on a steam bath for 2 hrs. and 5 g. hexaphenylcyclotrisiloxane in 30 ml. C6H6 was
     added similarly. After 30 min., the solvents were removed by passing N through the mixture for 1
     hr. The mixture was then heated at 125° for 15 min. and at 200° for 4 hrs. The product was
     extracted from the reaction mixture first with HOAc and then with C6H6, giving an 86% yield of a
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tough, white, OH-terminated polymer which was a diphenylsiloxane-methylphenylsiloxane-

II, fume SiO2, 20, 620, 430, 120, 146. Other compds. used as initiators were di-Li

dimethylsiloxane- dimethylsiloxane-methylphenylsiloxane-diphenylsiloxane 6-block copolymer. A diphenylsiloxane-dimethylsiloxane-diphenylsiloxane block copolymer was similarly prepared, and 100 parts polymer was milled with 1 weight % benzene-m-disulfonazide (I) at 140-50°, molded into a sheet at 175° and 5000 psi. for 30 min., and postcured at 175° for 2 hrs. Dicumyl peroxide (II) was also used as crosslinking agent (crosslinking agent, filler, parts filler, psi. tensile strength at room temperature, psi. tensile strength at 125°, % elongation at room temperature, and % elongation at 125° given): I, none, 0, 560, 390, 270, 200; II, none, 0, 420, -, 152, 111;

diphenyldisilanolate, di-K siloxanolate of meso-1,3-dimethyl-1,3-diphenyldisiloxane-1,3-diol, Li methyldiphenylsilanolate, 1,3,5-trimethyl-1,3,5-triphenylsiloxane-1,5-diol mono-Li salt, 5-tetrahydroaluminato-1,3,5-trimethyl-1,3,5-triphenyltrisiloxan-1-ol Li salt, Li 1,3,5-trimethyl-1,3,5-triphenylsiloxanolate, and tri-Li phenylsilanetriolate. These polymers do not cyclize and rearrange. The polymers can be used as insulation for elec. conductors, as encapsulating agents,

in capacitors, as coatings, and in room-temperature-curing compns.
IT 14778-18-8 14778-19-9 14778-21-3
17574-40-2 17574-42-4 17574-44-6
17574-46-8 17632-29-0

(catalysts, for block polymerization of cyclotrisiloxanes)

RN 14778-18-8 HCAPLUS

CN Silanol, methyldiphenyl-, lithium salt (8CI, 9CI) (CA INDEX NAME)

RN 14778-19-9 HCAPLUS CN 1,5-Trisiloxanediol, 1,3,5-trimethyl-1,3,5-triphenyl-, monolithium salt

needs another C-S; bond at each end?

OK for Claim 1 if:
If the Si compound
and the metal-salt
compound can be the
same compound,

Li

RN 14778-21-3 HCAPLUS

CN Silanetriol, phenyl-, trilithium salt

RN 17574-40-2 HCAPLUS

CN 1,3-Disiloxanediol, 1,3-dimethyl-1,3-diphenyl-, dilithium salt

RN 17574-42-4 HCAPLUS

CN Trisiloxanol, 5-butyl-1,3,5-trimethyl-1,3,5-triphenyl-, lithium salt (8CI)

(CA INDEX NAME)

One end is OK. Another C. Si is needed OH instead of the

p. 2 of 3

● Li

17574-44-6 HCAPLUS RN

Trisiloxanol, 1,3,5-trimethyl-1,3,5-triphenyl-, lithium salt (8CI) (CA CN INDEX NAME)

● Li

RN 17574-46-8 HCAPLUS

Silanediol, diphenyl-, dilithium salt (8CI, 9CI) (CA INDEX NAME) CN

17632-29-0 HCAPLUS RN

Aluminate(1-), tetrahydro-, lithium, compd. with cis, trans-2, 4, 6-trimethyl-CN 2,4,6-triphenylcyclotrisiloxane (1:1) (8CI) (CA INDEX NAME)

CM

CRN 16853-85-3

CMF Al H4 . Li

CCI CCS

CM 2

CRN 6138-53-0 CMF C21 H24 O3 Si3

Relative stereochemistry.

L92 ANSWER 4 OF 4 HCAPLUS COPYRIGHT ACS on STN

1961:5498 DN 55:5498 OREF 55:1066i,1067a-c ED Entered STN: 22 Apr 2001 AN

TI Silane esters and polymers therefrom

Midland Silicones Ltd.

APPLICATION NO. DATE PATENT NO. KIND _____

19600727 ΡI GB 842674 DE 1103333, 1961 US US 2967170)

ROH and .tplbond.SiH react at room temperature in the presence of H2PtCl6.H2O (I) to AB form.tplbond.SiOR. PhMe2SiH (II) and ROH in a mole ratio of 1:100 in the presence of I, 10-4 mole/mole II, gave PhMe2SiOR, in which R is PhCH2, Bu, C6H13, Me3SiCH2, Et, Me, p-ClC6H4, Me2CH, and Me3C. Similarly, PhSiH2OBu, PhSiH(OBu)2, EtMe2SiOSiMe2OBu, O[SiMe2(OCHMe2)]2, Ph2MeSiOBu, and AmSi(OBu)3 were prepared Organic acids also react with silanes in the presence of I. AcOH and II in the presence of I gave PhMe2SiOAc. Similarly, malonic, sebacic, phthalic, isophthalic, and terephthalic acids gave mono- and dibasic silyl esters. HOCH2CH2OH and Me3SiO(MeHSiO)xSiMe3 gave a compound containing HOCH2CH2O radicals attached to Si. BuOH, PhMeHSiCl, and I gave PhMeSiClOBu. Alkyl resins react with .tplbond.SiH in the presence of I to give silico-alkyd resins. Thus, a resin, prepared from 6 g. of a copolymer of PhSiO1.5, PhMeSiO, and MeHSiO, and 10 g. of a toluene solution of a copolymer of PhMeSiO, Me2SiO, MeSiO1.5, and PhSiO1.5, when heated at 150° in the presence of 35 p.p.m. I, gave a tack-free resin during 2 hrs.; without I a tacky product resulted. Such a polymer mixture also reacts with olefins in the presence of I by addition of SiH to the double bond.

Benzophenone, hydroxy-IT

(derivs., esters with Si-containing carboxylic acids)

16941-12-1, H2PtCl6

(catalysts, in esterification of silanes)

16941-12-1 HCAPLUS RN

Platinate(2-), hexachloro-, dihydrogen, (OC-6-11)- (9CI) (CA INDEX NAME) CN

CN

18106-50-8, Disiloxane, 1,3-diisopropoxy-1,1,3,3-tetramethyl-TΤ

(preparation of)

RN

18106-50-8 HCAPLUS
Disiloxane, 1,3-diisopropoxy-1,1,3,3-tetramethyl-

But metal cpd not in final product